RAILROAD GAZETTE

FRIDAY, JANUARY 13.

Contributions.

Notes by the Way—Passenger Cars.

SPRINGFIELD, Mass.

TO THE EDITOR OF THE RAILROAD GAZETTE:

"A passenger car," remarked a humorous master car-builder, "is a vehicle which runs on wheels and carries passengers: make it as you please, that is all there will be of it." This simple vehicle, however, already threatens to rival the locomotive as an object of attentive study, and what it will not become, in time, is still uncertain. Although the price of first-class passenger cars has been reduced considerably in the last ten years, their relative equated value may be said to have increased at least 10 per cent. A car selling for $5,000 in 1869 could probably be built to-day for at least $4,100; while the car now demanded costs, because of its "improvements" of various kinds, $4,500, or perhaps more. Our definition needs improvement, and should at least read: Passenger car, a pleasant, well-ventilated and tasteful sitting-room, which runs on wheels and carries passengers with great comfort, safety and cheapness.

THE NEW YORK CENTRAL STANDARD PASSENGER CAR.

Such a car is the standard passenger car of the New York Central & Hudson River Railroad. Previous to 1880—in March, 1880, the first passenger car was completed at the Albany shops—the passenger cars of the New York Central & Hudson River Railroad had been built by contract, as indeed are some of them still. For building, rebuilding and various repairs (many of them slight repairs) between 60,000 and 70,000 cars of all kinds pass under the hands of the Albany shops each year, leaving little leisure for work on new passenger cars. Since March, 1880, if I am not mistaken, between 75 and 100 cars have been built, including those now in various stages of construction. Part of these were for suburban service on the Hudson River Division.

The new standard is especially well fitted with ventilators. Besides the customary end windows in the clear-story, communicating with the opening in the hood at each end, there are three end window ventilators, two at one end, one at the other; also eight Hicks' globe exhaust ventilators in the deck, and perhaps 10 swinging sash. Couple these facts with another gratifying one, namely that the cabooses are also ventilated with the exhaust ventilators taken from old passenger cars, and it would seem unnecessary to ask anything more in the way of pure air for the immense passenger traffic of this road. Nevertheless, it is necessary to ask more. It is possible to keep a car quite too hot as well as to leave it too cold, and the joints of the piping of the Baker heaters should be looked after closely, or it will be easy to have an oppressive atmosphere. The vapor exhaled from so many lungs as are breathing into the atmosphere of a car saturates it sufficiently with other moisture.

The car is finished in mahogany, unstained, but with a centre of darker wood in each panel over a window, on the closet panels and on the door panels. The car is neatly finished, but the strong contrast between these two woods mars the general effect. The head linings also are common and vulgar enough in their gaudy paint and large figures to spoil the simplicity of the wood finish, but probably no part of car decoration needs more improvement than head linings. The seat covers of the suburban cars have been of split cane, and another lot will be fitted with perforated veneer seats. The suburban cars have also curtains at the windows, which are a great protection against the serious danger of the cold draught falling from the inner surface of a pane of glass which looks out on a freezing atmosphere—specially dangerous when falling on the back of a tired man.

The cars are trussed on the outside of the inner panel, so that it extends to the floor.

THE WASON MANUFACTURING COMPANY.

The shops of this company are full of work, for besides the list of cars given below there are orders placed with it for 38 others whose specifications have not yet been fully settled The following are in course of construction:

For the Northern Pacific, three first-class cars and three second-class. These are finished in solid ash, the brown ash of Canada, which makes a very pretty wood.

For the Oregon Pacific, three passenger cars and one baggage car, the former finished in cherry above, in ash below the window sill.

For the Central of Iowa, four passenger cars, which have already been sent to the road.

For the Indianapolis & Evansville, four passenger cars, finished in walnut and bird's-eye maple. Also two baggage, mail and express cars.

For the Wisconsin Central, one passenger car, finished in mahogany, now the prevailing wood.

For the Boston & Providence, four passenger cars, also finished in mahogany; and one smoking car finished in oak.

For the Wheeling & Lake Erie, ten passenger cars, finished in mahogany.

For the Savannah, Florida & Western, two drawing-room cars, finished in mahogany.

For the Central of New Jersey, ten passenger cars, finished in mahogany. These ten cars make a total of 244 passenger cars made by the Wason Manufacturing Company for this road.

For the Canada-Atlantic, eight passenger cars, finished in mahogany, and two baggage, mail and express cars, finished in ash.

For the Old Colony, three passenger cars, finished in mahogany.

For the Maine Central, six passenger cars, finished in mahogany, and one for the Housatonic road, in the same wood.

Excepting the few finished in walnut and bird's-eye maple, each of these cars is in one wood, with a simple square fluting on the panels, after the prevailing Queen Anne style.

This is certainly a great advance in the direction of improved taste, for there is need, first of all, of a basis of simplicity in our cars such as shall harmonize with their useful, business character. They are public drawing-rooms, indeed, and need to be neat and tasteful; but they are neither museums nor grand saloons for the display of ornamental woods and obtrusive scroll work in loud colors.

No doubt, however, strong contrasts of color and conglomerate effects have their value on new roads and in new countries; but there is little need for them on our older lines where a "stunning effect" falls like an offending blow. Simplicity is the first element of good taste in ornamenting useful things.

Mr. Fisk tells me that in all cars built by this company end windows are used as ventilators unless positive orders are received against their use. Whether he was the original discoverer, I do not know, but so far back as 1870, he experimented with this form of car ventilation and began to use it; fitting in a ventilator and covering the outside of the opening with wire gauze for fear of the dust and sparks.

He found this protection was quite unnecessary, however, and when the Boston & Albany began to use swinging sash in the end windows of its cars, he in turn followed their example, as they previously had followed his in using these openings.

X. Y. Z.

The Drinks of the Railroad Man.

TO THE EDITOR OF THE RAILROAD GAZETTE:

What the man of the railroad drinks is so much more important than what any one else drinks that no excuse or apology should be necessary to him or to any one else for singling out his beverages for special attention. I find in a pamphlet published in the *Railroad Gazette* some time ago (entitled "Railroad Employés in France") words as follows:

"In the winter, when the temperature falls much below the freezing point, the engine-men, firemen and train-men are, while running certain sections on the Eastern Railroad, exposed to intense suffering caused by cold. We have judged that this was an occasion for applying, at least exceptionally, a measure in general use on the Russian railroads by giving hot tea to the men exposed to severe cold; this drink has a much more salutary effect than alcoholic beverages, and the results of its use have been very satisfactory.

"The expenses attending them have been:

Summer, 1864, cold drinks	$1,880
Winter, 1864-5, hot "	1,605
	$3,485

I think, as a general rule, no man uses large quantities of two stimulants (except tobacco and alcohol, which do not seem to have similar effects) at one and the same time. Other men appear to think the same, for a robust engine-man, who was telling how much coffee he had used as a fireman, remarked: "I have observed that men who drink a good deal of coffee do not drink so much liquor." In fact, it is remarkable how much coffee is consumed on roads where men are temperate: it is used literally by the quart, and sometimes by the gallon. Why?

Simply because men doing heavy work—and living out in cold, freezing air is itself heavy work—crave some food which rouses up the nerves to their work. They want a quicker movement of the blood, and this coffee produces.

Also they want somewhat warm to quench the thirst which work before a hot fire brings on.

A few words, therefore, about coffee. Get the real article—no chicory—and grind it yourself. Don't make it bitter by long boiling, if it is to be drunk between meals, because that will give you a tan water—for coffee contains a large element of tan (tannic acid), and you probably have no desire to tan your own stomach. Drunk at meals, however, there is little to be careful about. Coffee tan, however, is not so bad as tea tan; tea-drinkers (engine-men) are apt to have sour stomachs. Some bilious men cannot, however, drink coffee, and had better use tea. Coffee is better in the morning, tea at night. On a cold day take coffee when you go out—there is nothing like it, as the Arctic explorers discovered—and tea when you come in, cold and worn-out. If you have had a heavy chill from the cold, take 5 or 10 grains of quinine. This is what the doctors do—those who are little given to taking their own medicine.

If a man has a long, cold job, a jug of hot milk and strong coffee will help him through, if he does not fill his stomach too full of other things.

Finally, don't drink too much coffee—that is to say, drink it as you like on cold days, and in other weather thin it down, with hot milk at meals, with hot water between them.

HYGIENE.

Transportation in Congress.

In the House on the 11th:

Mr. Robeson, of New Jersey, offered the following resolution:

"*Be it Resolved, etc.*, That the grants of public lands heretofore made to certain railroad companies and to certain states, to aid in the construction of roads and railroads for the benefit of certain corporations, named in the schedule hereto appended, so far as the same have not been earned by the fulfillment of the conditions of said grants, be and the same are hereby declared forfeited, and shall revert to the United States and be open to settlement as are other public lands. It shall be the duty of the Secretary of the Interior, within — days from and after the passage of this act, to cause public notice to be given by advertisement that the reservations made for the benefit of said companies, as in the said schedule hereunto affixed, be and the same are vacated, withdrawn and annulled, and that said lands are open to settlement, and that entries thereof and therefor will be received at the land offices in the several districts in which said lands are located, on the terms and conditions prescribed by law."

The schedule referred to in the resolution enumerates the following railroads, together with the estimated quantity of land granted to each:

Name of railroad.	Estimated acres.
Gulf & Ship Island	652,800
Alabama & Florida	419,520
Coosa & Tennessee	132,480
Mobile & Girard	840,880
Coosa & Chattanooga	150,000
Alabama & Chattanooga	897,920
Pensacola & Georgia	1,568,729
Florida, Atlantic & Gulf Central	183,153
Vicksburg, Shreveport & Texas	610,880
New Orleans, Baton Rouge & Vicksburg	3,800,000
St. Louis & Iron Mountain	640,000
Little Rock & Fort Smith	1,009,296
Detroit & Milwaukee	355,420
Houghton & Ontonagon	552,515
North Wisconsin	1,408,455
Wisconsin Central	1,800,000
Saint Paul & Pacific, Saint Vincent Extension	2,000,000
Saint Paul & Pacific, Brainerd Branch	1,475,000
Hastings & Dakota	550,000
Oregon Central	1,200,000
Atlantic & Pacific	42,000,000
Texas Pacific	18,000,000
Northern Pacific	47,000,000

Ohio Railroads.

The message of Governor Foster, of Ohio, to the Legislature, contains the following statements relating to the railroads of the state

The Commissioner of Railroads and Telegraphs has discharged the important duties confided to his care with a degree of faithfulness and intelligence that is highly commendable. His report shows an increasing prosperity in this department of our industries.

A comparison of the year ending June 30, 1881, with the preceding year, in the more important features of railroad affairs, in terms of the per cent. of gain, will show their relative prosperity.

There were, June 30, 1881, 5,840.388 miles of railroad; an increase over the preceding year of 3.448 per cent.

The amount of stock and debt was $380,709,530.35, an increase of 3.9 per cent.; the gross earnings were $45,843,866.34, an increase of 9.553 per cent.; the operating expenses were $29,378,562.82, leaving the net amount of earnings $16,465,303.52, an increase of 4.483 per cent., amounting to 4.324 per cent. on the stock and debt.

Of the gross receipts, the passenger earnings amounted to $10,320,517.98, an increase of 10.822 per cent.; the freight earnings to $33,415,533.28, an increase of 9.753 per cent.; the mail earnings were $1,047,698.55, an increase of 13.986 per cent., and the express earnings were $832,994.67, an increase of 26,905 per cent. From other sources the receipts were $862,704.22, an increase of 9.137 per cent.

It will be seen that while the increased mileage is not quite 3.5 per cent., there was an increase in the various classes of receipts from 9 to 26 per cent., averaging nearly 11 per cent.

There was expended in the maintenance of way and structures the sum of $14,059,005.10, an increase over the previous year of 20.329 per cent. This may be in part attributable to the increased cost of material and labor, but largely to the fact that railroad managers have been actively engaged during the year in bringing their roads up to the proper condition to bear the increased demands of traffic.

The cost of transportation was $23,768,604.45, an increase of 16.618 per cent. This cost has increased in greater ratio than the gross receipts.

The employés, including officers, number 32,207, an increase of 9.529 per cent.

In looking over the past 10 years, and comparing the leading features of our railway system, then and now, it will be seen that the mileage has increased 68.914 per cent.; the stock and debt 81.667 per cent.; the gross earnings 50.879 per cent.; the operating expenses 41.404 per cent.; and the net earnings 71.366 per cent.

In 1871 the average rate per mile for passengers was 3.957 cents. Since then, to June 30, 1881, the passenger traffic has increased 122.538 per cent., and passenger receipts 33.518 per cent.; and at the same time the average rate per mile for passengers has been reduced to 2.336 cents, a reduction of 40.966 per cent.

The average rate per ton per mile for freight in 1871 was 2.215 cents; in the ten years following the amount of tonnage has increased 328.821 per cent., and the receipts therefrom 77.133 per cent.; and at the same time the average rate per ton per mile has been reduced to 0.915 cent, a decrease of 58.691 per cent.

An inspection of the railroads was made during the past summer and autumn by three competent civil engineers. They report great activity upon most of the roads in the work of bridge building, replacing wooden with iron bridges, and trestles with embankments, reducing the grades, increasing substantial ballasting, and a general tendency toward lasting improvements. They represent that there is generally a most excellent and safe condition of railway. When faults have been found by the inspectors, immediate assuring promises of prompt repair have been made by the managers or superintendents.

The railroads of Ohio represent over $380,000,000 of active capital. Many of our people are largely interested as owners of the capital thus employed, and it is therefore highly important that the financial and physical condition of these roads shall at all times be fully understood; and in this view it is desired that the laws should be revised, in some particulars, better to enable the Commissioner to secure more thorough and prompt reports from railroad companies, and that more liberal appropriations be made to enable him to fully discharge the important duties of his office.

But for the courtesies of railroads themselves in furnishing transportation and the most complete facilities, the examinations could not have been made with the appropriation available for this purpose.

There are exceptional cases where the management of a railroad is neglectful of the means for a safe transportation of its passengers. Provision should be made for a thorough

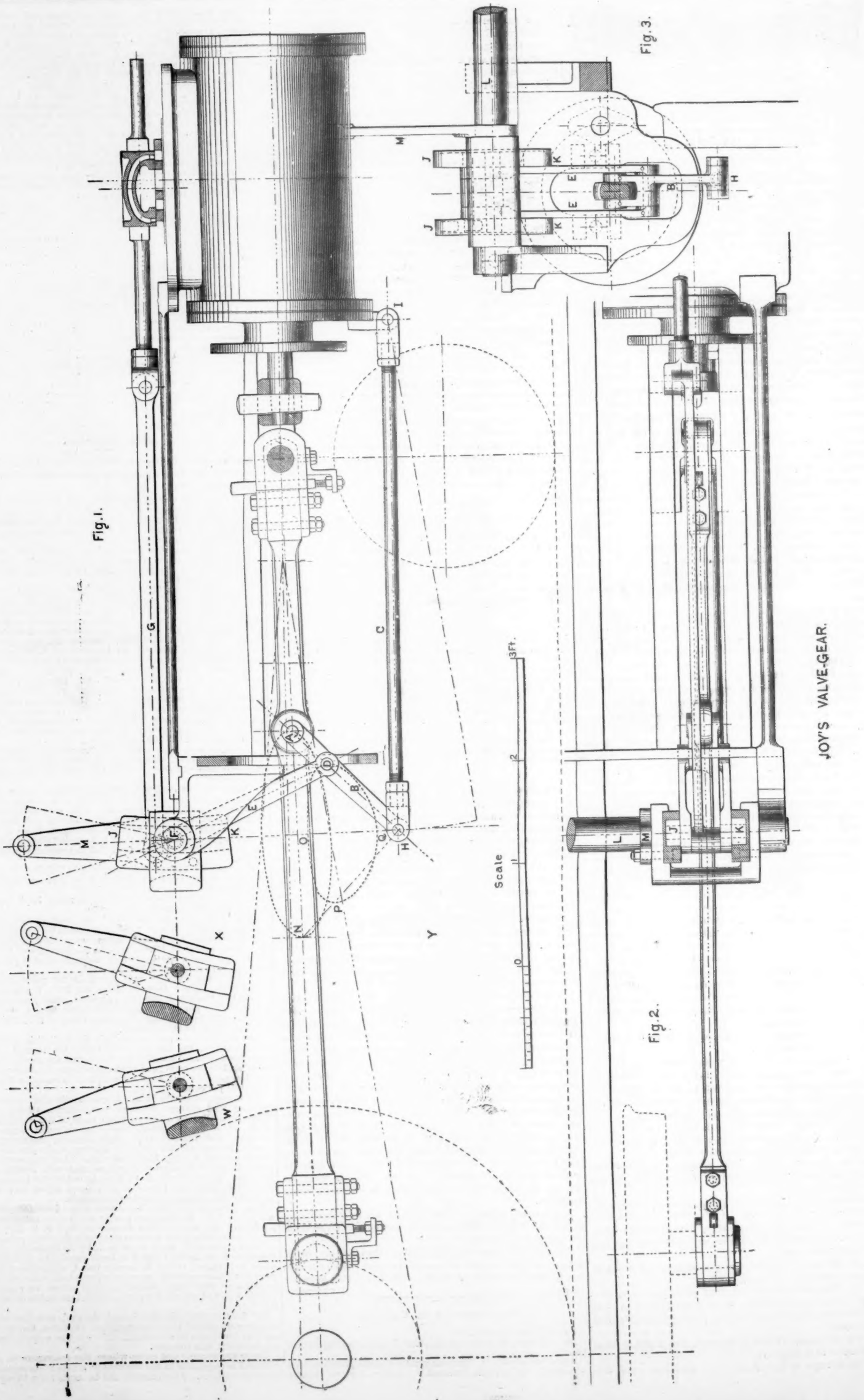
Fig.1.
Fig.2.
Fig.3.
Scale
3Ft.
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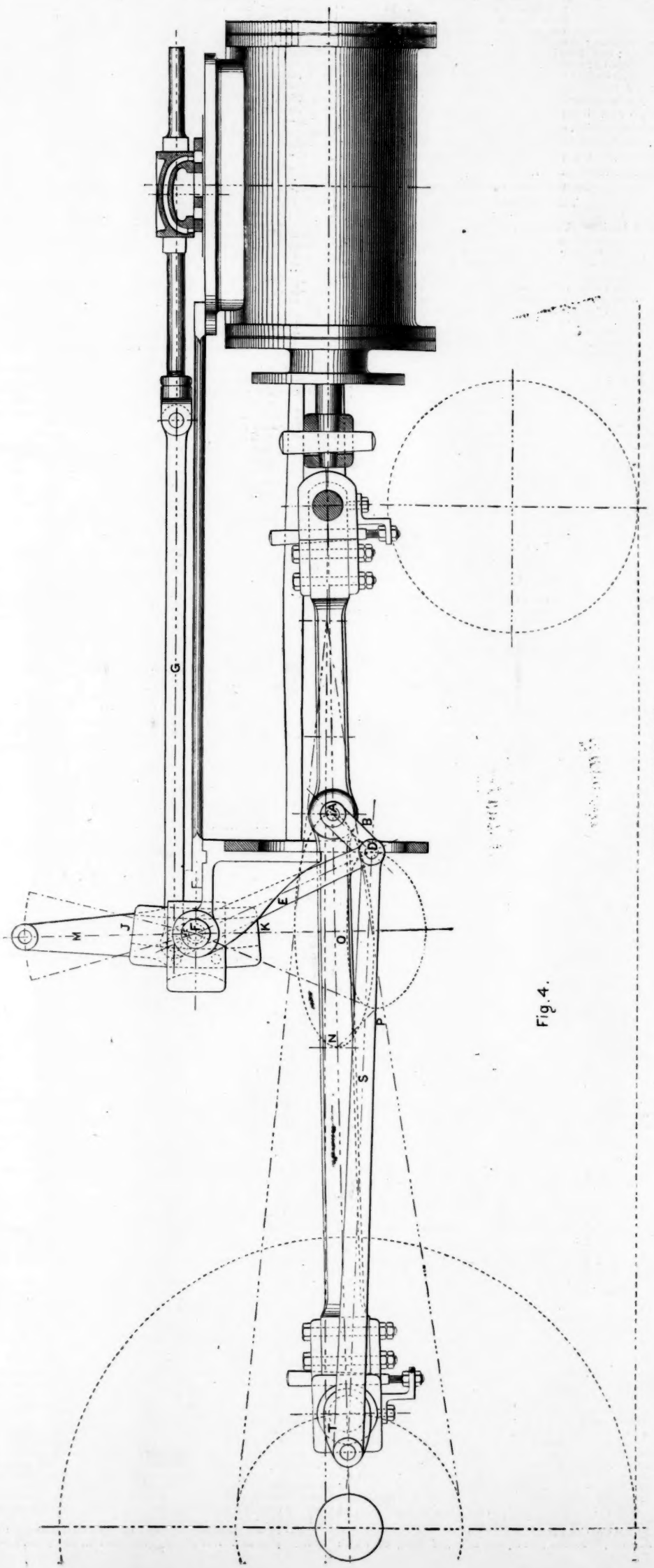
JOY'S VALVE-GEAR.



JOY'S VALVE-GEAR.

Fig. 4.

inspection annually, to enable the Commissioner to point out such neglect, and enforce such repair as may be found necessary; and further, to empower him to bring into his office a full account of every physical feature of our railroad system.

Joy's Valve-Gear.

To many mechanical engineers it will probably seem almost like desecration to question the superiority of the link-motion over all other forms of reversing and expansion gear for locomotives. The introduction of that mechanism was at first bitterly opposed, but afterwards its victory was so complete that mechanics have fallen into the habit of of thinking that nothing can supplant it. Nevertheless it seems probable that its days are numbered, and that some of the new forms of valve-gear which have been introduced during the past few years will, possibly with some modifications, take its place. In the *Railroad Gazette* of April 28 of last year there was published a very good example of the Walschaert gear designed by Mr. Charles Brown, of the Swiss Locomotive Works, Winterthur. This is very extensively used in Europe on the continent, but not in Great Britain. In this country it has not met with much favor, excepting from Mr. Wm. Mason, of Taunton, who has applied it to his double-truck locomotives. In our issue of Dec. 28, 1877, a valve-gear invented by Mr. Brown, of Winterthur, was illustrated. This is very similar in principle to Joy's valve-gear, represented by the engravings herewith. Mr. Joy, however, claims to have improved the gear, so as to give a more correct motive to the valve, and to have simplified the mechanism. The engravings published herewith represent a design by Mr. Joy of a method of applying the gear to an outside cylinder engine of the American type. The gear has been described as follows by him:

"In this valve-motion eccentrics are entirely dispensed with. The motion for the valve is taken direct from the connecting-rod, and, by utilizing independently the backward and forward action of the rod, due to the reciprocation of the piston, and combining this with the vibrating action of the rod up and down, a movement results which is employed to actuate the valves of engines using any combination of lap and lead desired, and giving an almost mathematically correct cut-off for both sides of the piston for forward and backward motion, and for all points of expansion intermediately. The action of the gear may be understood by reference to the engravings, figs. 1, 2 and 3, which are respectively an elevation, plan and transverse section on *XY* of fig. 1 looking forward.

"From a point, *A*, Fig. 1, in the connecting-rod, motion is imparted to a vibrating link, *B*, constrained at its lower end, *H*, to move vertically by the radius rod, *C*, which is pivoted at *I*. From a point, *D*, on this vibrating link, *B*, horizontal motion is communicated to the lower end of a lever, *E*, from the upper end of which lever the motion is transmitted to the valve-spindle by the rod *G*. The centre or fulcrum, *F*, of the lever *E*, partakes also of the vertical movement of the connecting-rod to an extent equal to the amount of its vibration at the point *A*; the centre *F* is for this purpose carried vertically in blocks which slide in slots in the links *J K*, which are curved to a radius equal to the length of the rod *G*, connecting the lever *F* to the valve spindle. These links are attached to a shaft, *L*, figs. 2 and 3, corresponding to the ordinary lifting shaft of a link motion. The centre of this shaft corresponds to the position in which the fulcrum *F* of the lever *E* is represented in fig. 1. The shaft *L* and the links can be partially rotated on the centre of the former, so that the slots in the links will be inclined over to either side of a vertical position, as shown at *W* and *X*. This is done by means of an ordinary reverse lever connected to the upper arm, *M*, attached to the shaft *L*. When the links are thus inclined, the vertical movement of the lever *E* causes the blocks in the links and the centre *F* to traverse a path inclined to a vertical centre line; and to diverge from it to either side. The centre *F*, therefore, has a horizontal movement, the extent of which depends upon the degree of inclination of the links, and the direction of which is governed by their position.

"The forward or backward motion of the engine is governed by giving the slots this inclined position on one or other side of the vertical centre-line; and the amount of expansion depends on the amount of the inclination, the exactly central or vertical position being 'mid-gear.' In that position steam is admitted at each end of the stroke to the amount only of the lead; and this is done exactly equally on each side of the centre-line, the amount of lead being constant for forward and backward motion, and for all degrees of expansion. Thus when the crank is set at the end of the stroke either way, the centre, *F*, of the valve-lever coincides with the centre of the slot, and therefore the slot may be moved over from forward to backward gear without affecting the valve at all.

"It will be seen at a glance that if the lower end, *D*, of the lever *F*, were attached directly to the point *A* on the connecting-rod, it would travel in the path of the ellipse *A N*, represented by dotted lines, and there would be imparted to the centre, *F*, of that lever, an unequal vibration above and below the centre of the links, *JK*. The extent of inequality would be twice the versed-sine of the arc described by the lower end *D* of the lever *E*; and this would give an unequal port and unequal cut-off for the two ends of the stroke. But this error is corrected by attaching the lower end *D* of the lever *E* to the vibrating link *B*; for while the point *A* in the connecting-rod is performing a nearly true ellipse, the point *D* in the vibrating link *B* is moving in a figure, *DOPQ*, like an ellipse bulged out on the lower side, and this irregularity is so set as to be equal in amount to the versed-sine of the arc described by the lower end, *D*, of the lever *E*, thus correcting the above error, and giving an equal travel to the centre *F* of the lever above and below the centre of the slot. At the same time the error introduced by the movement of the end of the valve-rod *G* is corrected by curving the slots or links *J K* to a radius equal to the length of *G*.

"Referring again to the equalizing of the traverse of the centre *F* of the lever *E* in the slot *J K*, the unequal traverse may be either under corrected or over corrected by shifting the point *D* in the vibrating link *B* nearer to or further from *A*; by this means a later point of cut-off may be given to either end of the cylinder at will, and the engine may thus have more steam admitted to one side of the piston than to the other, if required. The same thing may be done for the lead. By altering the position of the crank for which the lever centre *F* coincides with the centre of the slots *J K*, an increased or diminished lead may be given. The central positions and exact connections are, however, in all cases standard and equal.

"Hitherto the centre *F* of the lever *E*, which gives motion

to the valve-spindle, has been described as carried in curved slots. This plan is given as the most simple to manufacture, but if preferred the centre *F* may be carried by a radius-rod so that its vibration will make the centre *F* of the lever *E* describe identically the same arc as if moving in the slot *J*."

In locomotives with small wheels the link *C* may come so low down as to be in danger of being knocked off. For such cases—and for others when it may be considered desirable—Mr. Joy has proposed the plan shown in fig. 4, in which the link *B* is cut off at the centre *D*, and is connected at that point by a rod *S*, to a crank *T*, on the end of the crank-pin. The movement of the valve produced by this mechanism is almost identical with the other.

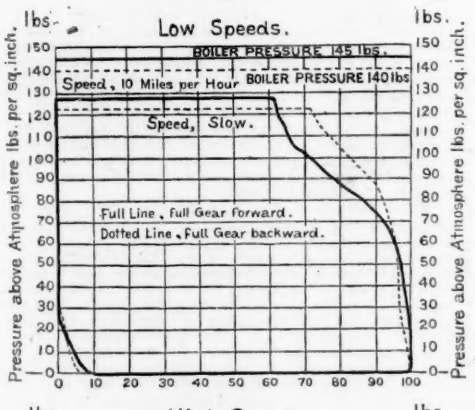
We now come to the advantages claimed for this system. Taking the link gear for our standard these have been stated by the inventor as follows: First, it is simpler and less costly than the link gear by fully 25 per cent., taking the best forms of application in both. A comparison of the two shows a saving in weight of that amount. The saving is not only in weight, however, but also in the greater simplicity of parts, allowing increased facility for tooling and fitting.

Second, the gear is more correct than the link-motion. By setting out the centre lines properly, a valve-path diagram is given in which the lead and cut-off are exactly equal for both ends of the cylinder, and they remain so in all grades of expansion to mid-gear; and when the port opens and closes by the amount given as lead at equal distances in each side of the centre line.

Third, the valve is opened more rapidly, the cut-off is more prompt, and the exhaust port is opened more quickly than with a link-motion.

Fourth, it is more accessible than the old gear; all the main working parts are on the outside under the direct inspection

Fig. 5.



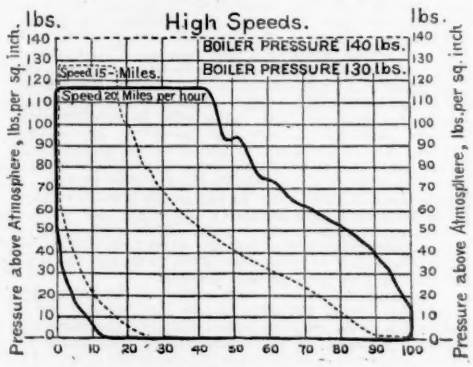


Fig. 6.

of the engineer and within easy reach for examination, oiling and repair.

Fifth, the motion of the valve is not, as in the link-motion, limited by a given throw of eccentrics, but as the reversing depends on the angle to which the links *J K* are inclined, it is only necessary to carry them over a slight amount beyond the usual full gear, or say 75 per cent. cut-off, to give an extended opening to the port which may be carried as far as to allow steam on the piston for 90 per cent. of the stroke. Hence wherever an engine might happen to stand it would never be necessary to back it to get away with a train. It would only be necessary to push over the lever, giving a little extra angle to the links *J*, *K*, and, as stated, the action of the steam would be prolonged on the piston to any desired point.

Mr. Webb the Locomotive Superintendent of the London Northwestern Railway, has applied this gear to one of his freight engines with inside cylinders, and we have been informed that its success has been so great that it will be used on a number of others now in course of construction.* At the meeting of the Institution of Mechanical Engineers last year, when Mr. Joy read his paper, Mr. Webb described the construction of the gear as follows:

"The reversing shaft was a hollow casting of cast iron. The curved segments forming the slides for the valve-motion were turned up in the lathe in a circle of the proper radius, and then cut off in sections of the required length; they were made of mild steel and afterward case-hardened. For oiling the valve-slide blocks the oil-cups were carried on the top of the slides, so that they could be oiled while the engine was running at full speed. All the working and wearing parts were circular bushes of hard phosphor-bronze, and any of them could be removed by slacking back the oil-cup, which was used for locking in the bush. The oil-cup entering into the bush, this prevented it from revolving; and by simply slacking back the oil-cup, the bushes could be removed. The coupling-rods were bushed on the same method of locking in the bronze bushes by the oil-cups; and the oil-cups were themselves locked in in a simple way by a bit of wire."

Figs. 5 and 6 are indicator diagrams taken from Mr. Webb's locomotive, and show the working of this gear.

Mr. Wayland Turner, whose office is at No. 120 Broadway, New York, is the agent for introducing this valve-motion into this country.

* Since the above was written, we have learned that the inventor has concluded an arrangement for applying this gear to 50 engines, all ordered alike, and a number of English railroad companies are talking of adopting it.

THE SCRAP HEAP.

A New Railroad Signal.

James Dolan, of Succasunna, in this county, has just obtained a patent for another sort of signal for use at switches, the device being designed to afford additional security against accidents by giving warning to approaching engines when switches are open or misplaced. The new signal is operated in connection with the ordinary safety signals, and is worked by the usual switch operating machinery. The signal is provided with an apparatus called a "turning dog" which is placed near the track rails, and is operated simultaneously with the switches, turning whenever they are touched, either by accident or design. Levers are placed upon engines whenever this signal is in use, and are so arranged that as the train approaches toward a switch that is open or out of order in any way the lever encounters the "turning dog." This presses the lever and causes it to strike a gong on the engine. As it is impossible for this occurrence to take place where everything is in readiness for the train to go ahead on its way the engineer knows the moment he hears the gong ring that there is something the matter and brings his train to a stop, the warning apparatus, which strikes the gong, being situated at a sufficient distance from the switches to allow ample time for the engine and cars to come to a full stop before the danger is reached. It would appear this device affords an effectual check against the danger now more or less frequently encountered through the carelessness of switchmen, and is calculated to reduce to a minimum the accidents which now occur by reason of improperly tended switches. The invention has been given a thorough trial, and has been pronounced a complete success.—*Madison (N. J.) Journal.*

The British Institution of Civil Engineers.

At the sixty-third annual meeting held on Dec. 20 it was reported that there were on the books on Nov. 30 last 18 honorary members, 1,261 members, 1,406 associate members, 552 associates, and 662 students; altogether 3,899.

The income last year was £12,398 11s. 5d. ($59,513.14), besides which the receipts had included £3,076 14s. on account of admission fees and life compositions and £431 5s. 6d. from dividends in trust funds.

Centrifugal Lubrication.

The crank pins of the new steel shaft which has been fitted to the "Mercury" being hollow has afforded the engineer department at Portsmouth an opportunity for testing the practicability of keeping the bearings cool by means of centrifugal lubrication, and thus dispensing with the usual telescopic lubricators. The new system consists in carrying a supply of oil into the centre of the pin by means of a tube running along the arms of the crank, the centrifugal force which is set up by the mere rotation of the shaft sufficing to carry the oil where it is most required, a few apertures bored into the pin enabling it to reach the bearings and brasses. The bearings of the "Mercury" have previously given considerable trouble, but at the recent trial the results were found so very satisfactory during a full-power spin of an hour and a half that it is now proposed to apply the method to the engines of the "Euphrates." The shaft of the trooper being of the usual iron description, it will be necessary to bore the crank pin for the purpose, but as the diameter will not exceed two inches, there will be no diminution of strength.—*Iron.*

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the present volume of the *Railroad Gazette:*

Philadelphia & Reading.

We published last week a summary of the Receivers' report of operations for the year ending Nov. 30, and now give some parts of the report of President Bond and the board of managers for the year.

This report gives the following statement of the company's property:

"In submitting this yearly report, the properties of the Railroad Company and the Coal & Iron Company will be treated as one interest, both having a common ownership. The figures given cover accounts of both companies for the fiscal year ending Nov. 30, 1881.

"The principal properties owned, controlled and leased are the following:

"By the railroad company—

"A.—846.3 miles of railroad—306.1 miles of double track and 556.2 miles of coal lateral lines and sidings, in all equal to 1,708.6 miles of single track, with 508 locomotive engines and 21,960 passenger, freight and coal cars, which is the equivalent of 18,188 eight-wheel cars, with machine and other shops and conveniences necessary for repairs and reconstruction. The books show the total expenditures for account of this property, including the ship-yard at Port Richmond and the rail mill at Reading, to have been $45,308,742.06.

"B.—153.23 miles of canal and slack-water navigation, with 328 canal barges, 332 mules, with other equipment and stock necessary for working these properties. The yearly rentals paid by the company for this class of property amount to $879,265.20. Capitalized at rate of 6 per cent., they represent a cost of $14,654,420.

"C.—Thirteen steam colliers, with tonnage capacity of 15,600 tons, 66 coal barges, 2 schooners and 2 steam tugs for use at Richmond terminus in distributing coal to the various points along the coast. The cost of this property is shown by the books to be $3,038,324.

"D.—$12,256,377.95, par value of stocks and bonds that have cost the company $8,042,762.12; for particulars of which reference is made to Table A.

"By the Coal and Iron Company:

"A.—160,566 acres (251 square miles) of land, of which 91,149 acres (142 square miles) are anthracite coal lands, being 60 per cent. of the anthracite coal areas in what are known as the Schuylkill, Shamokin and Mahanoy coal districts, and 30 per cent. of all the anthracite coal fields in Pennsylvania. There are 87 workable collieries on the properties owned and controlled by the company, including the 9 on leased lands, of which 50 were worked by the company, 21 were leased, and 16 were idle during the last year. The books show the actual capitalized expenditures to Nov. 30, 1880, for account of this property, excluding interest and losses in working, to have been $44,840,739.69.

"B.—15,010 acres of iron ore lands (9,091 acres held under lease), with 5 workable ore-banks or mines, represent, including the improvements, a cost of $859,769.

"C.—14 iron furnaces for the manufacture of pig metal, 2 iron rail mills and 5 other iron manufacturing establishments. These properties have cost the company $2,490,550.

"D.—$11,055,746.06, par value of stock and bonds that have cost the company $5,955,297.09; for particulars of which reference is made to Table B.

"The ownership or control of these various properties, including the company's investment in stocks and bonds and properties controlled by lease or otherwise, represent a capitalized cost, as shown by the balance-sheet, of $210,089,924.27.

"The figures in these statements are based on a joint balance-sheet of the Railroad Company, the Coal & Iron Company and the Receivers, dated Nov. 30, 1881."

The report then gives the statement of earnings made by the Receivers. By charging up the sinking funds, however, the surplus reported by the Receivers for the railroad company is converted into a deficit for the year of $818,411.35.

The report further says that certain charges for renewals and new equipment carried by the Receivers to construction accounts should properly have been charged to operation. The amount of these charges is $2,190,184.52, or $2,007,628.38 in excess of the surplus reported for the two companies for the year.

The General Manager reports that there is needed for the current year $161,000 for improvements of road and $1,668,100 for new equipment. The Chief Engineer reports $919,795.75 needed for new work, exclusive of 27 miles of new second track on the Bound Brook Division, which is much needed.

The Mining Engineer reports $170,000 required for new work. The capacity of the company's estate could be increased 25 per cent. by the expenditure of $795,000 during the next 18 months.

COAL PROPERTY.

The report treats at much length of the coal property of the company; from this portion the following is taken:

"A brief description of the area of anthracite basins in Pennsylvania, their location and comparative distances from tidewater, is necessary in order to give a proper understanding of the coal business.

"There are three distinct divisions of anthracite coal territory, known as:

The Schuylkill District	237	square miles.
" Wyoming "	198	" "
" Lehigh "	37	" "
Total anthracite area	472	" "

"This coal territory is located altogether in the state of Pennsylvania, in eight counties, viz., Luzerne, Lackawanna, Schuylkill, Northumberland, Carbon, Dauphin, Columbia and Susquehanna.

"The Schuylkill District consists of what is known as:

The Southern coal fields	146	square miles.
" Middle coal fields, Shamokin	50	" "
" Middle coal fields, Mahanoy	41	" "
Total	237	" "

"The coal estates of the Philadelphia & Reading Company lie altogether in this Schuylkill District, in the counties of Schuylkill, Columbia, Northumberland and Dauphin. They consist of 91,149 acres (142 square miles) of coal lands, which is 60 per cent. of all the anthracite lands in the Schuylkill District, and 30 per cent. of all in Pennsylvania.

"The company also own nine colleries on leased lands—four being on lands belonging to the city of Philadelphia, four on the Gilbert lands, and one on the lands belonging to the Girard heirs, all lying near the centre of the Mahanoy district.

"The number of workable collieries owned by the company is 87, of which 71 were in operation last year, including 9 leased collieries, and produced 5,425,951:15 tons of coal. The distance from Schuylkill Haven, the principal coal shipping point in the Schuylkill District, to tidewater at Port Richmond is 89 miles, via the Reading Railroad; from Mauch Chunk, the principal shipping point in the Lehigh District, the distance to tidewater is 116 miles; from Wilkesbarre, in the Wyoming District, the distance to tidewater is 168 miles; and from Scranton, in the Lackawanna region, the distance is 148 miles to tidewater. These figures show that the Reading property is nearer by 55 miles than the average distance from the other coal districts to a shipping point at tidewater; and there is also a very decided advantage in gradients, as, practically, a locomotive engine on the Reading road can handle as many loaded cars in a train to Port Richmond as it can haul back empty ones.

"At Port Richmond the company owns very extensive and complete arrangements for handling, storing and shipping coal, which, coupled with such advantages in both gradients, and distance from the coal producing districts, should enable the Reading Company to produce and transport to market its full proportionate amount of the output of anthracite coal from the Schuylkill District, and relatively as an owner of coal territory, its proportionate amount of the aggregate output from all the anthracite districts.

"This it has not done during the last five years. The percentage of Schuylkill output transported by the Reading Company has steadily diminished from 83.49 per cent. in 1877, to 75.45 per cent. in 1881; and the percentage of the aggregate output from all the anthracite districts, that was transported by the Reading Company, has as steadily diminished from 32.82 per cent. in 1877, to 24.44 per cent. in 1881. * * * *

"A.—In line and local tonnage by rail (including Philadelphia and points on the Delaware from Trenton to the Capes) there was an average increase of 812,154 tons, or 46.12 per cent. gain in eleven years, which is at the rate of but 4.2 per cent. yearly since 1869.

"This increase in line and local tonnage was not equal to the natural growth of the country, and more especially of the manufacturing and industrial interests along the line of road and in the city of Philadelphia. The great natural advantages of the Reading Company in this field would of itself seem to be a sufficient protection in supplying this local demand, and should have enabled the company to compete successfully in these markets with other coal producing companies.

"B.—In competitive tonnage to Port Richmond (less Philadelphia and river tonnage included in local) there was

an average decrease of 128,004 tons, or 7.1 per cent. in comparison with 1869. Of competitive tonnage to Elizabethport, South Amboy and Port Johnson (hauled 80 additional miles from Philadelphia via Bound Brook route), the average yearly shipments were 484,461 tons, against nothing in 1869, as the Bound Brook route was not then opened.

"The competitive tonnage via Port Richmond has decreased an average of 128,004 tons, or 7.1 per cent. during each of the past three years from what it was eleven years before, although the company has during the whole period from 1869 to 1881 owned extensive and convenient storing and shipping facilities at that point, and its railroad has the advantage of easier gradients, with a shorter haul to tide water, than the roads of any other coal transportation company. The average yearly shipment over the Bound Brook route to New York Bay of 484,461 tons represents what would probably have otherwise been the natural increase in yearly shipments via Port Richmond. The decrease in tonnage by rail and the Delaware & Raritan Canal, and by the Schuylkill Canal and the Delaware & Raritan Canal, very nearly equals this increase. Unless Port Richmond has reached its maximum capacity as a coal-distribution and shipping point, it would seem to be of doubtful expediency for the company to ignore its advantages by transporting its coal tonnage 80 additional miles, in part over the road of another corporation, from Philadelphia to New York Bay, where it must be handled and delivered at an increased cost from a terminal property not owned by this company. Any surplus of production that cannot be disposed of locally, or via Port Richmond, should of course be sent to the nearest market, and there is an obvious advantage in having the use of the Bound Brook line in case of the closing of the navigation of the Delaware by ice; but it would seem to be the true policy of the company to stimulate and increase as much as possible coal shipments to points on its own road and to competitive points via Port Richmond and Philadelphia that can be reached by its barge lines and steam colliers and other water transportation.

"C.—East-bound tonnage, 107,736 tons, via Lehigh Valley Railroad (1.5 miles haul).

"West-bound tonnage, 25,476 tons, via Catawissa Branch (66¼ miles haul).

"West-bound tonnage, 469,723 tons, via Northern Central Railroad (4¾ miles haul).

"The average shipments of east and west-bound tonnage during three years aggregate 619,185 tons yearly, against nothing in 1869.

"The aggregate shipments east by the Lehigh Valley and west by the Catawissa Branch and the Northern Central Railway seem to have reached the maximum in 1879, as they have steadily decreased each year since then.

"D.—Lehigh and Wyoming tonnage (two-thirds hauled 5.2 miles, one-third hauled 33.51 miles).

"These average yearly shipments were 817,084 tons; the increase over 1869 was 266,550 tons.

"Of the Lehigh and Wyoming tonnage two-thirds of it should not properly be reported at all, as it is little more than a transfer for a distance of 5.2 miles, at Silverbrook Junction, and the transfer charge of 5 cents per ton is all the company receives from this source. The remaining third, by Allentown and Bethlehem, is hauled but 33.51 miles.

"Comparing the reported coal tonnage moved by the Reading Company during 1879, 8,147,579 tons (the largest ever reported in the history of the company), with that for 1869, if we deduct canal shipments, shipments of bituminous coal, and coal used on laterals and by the company, the increase was but 2,237,013 tons, or 54.4 per cent., in ten years. If we deduct from such increased tonnage that from which little or no net revenue is derived, *i. e.*, the Lehigh and Wyoming transfer, the east and west shipments by the Lehigh Valley, Northern Central and Catawissa roads, it leaves but 1,379,563 tons, or 38.8 per cent. increase over 1869.

"For 1880, making the same deductions, the gain was but 798,832 tons, or 22.5 per cent. over 1869.

"For 1881, making the same deductions, the gain was but 1,334,059 tons, or 37.5 per cent. over 1869.

"The yearly average increase for 1879-80-81 over 1869 was but 1,170,818 tons, or 32.6 per cent. of what may be considered as pay or revenue tonnage.

"The total output of anthracite coal from all the coal districts was 28,230,370 tons in 1881, against 13,723,030 tons in 1869, an increase of 105.7 per cent.

"The total output from the Schuylkill District increased from 5,725,138 tons in 1869 to 9,146,524 tons in 1881, or 59.7 per cent., but, as before stated, the increase of the Reading Company's paying tonnage was only 37.5 per cent."

The report further speaks at much length of the past policy of the anthracite companies.

It will be noticed that profit and loss account is unusually large; this occurs from writing a number of items from the general ledger balances that do not represent value, as follows:

Railroad Company.

Debit balance income account, Nov. 30, 1881	$2,470,651.76	
Schuylkill Navigation Co.'s works and franchises	1,000,000.00	
Discount, commissions and expenses—general mortgage loan	500,000.00	
Sundry bad accounts	9,763.67	
Stocks and bonds not valuable	20,000.00	
Loss on P. & R. R. R. Co. stock—cost	131,824.20	
		$4,214,239.63

Coal & Iron Company.

Debit balance income account, Nov. 30, 1881	$7,509,304.38	
Windmill Island Ferry Co. stocks and bonds not valuable	44,836.16	
Bonds and mortgages not valuable	6,555.67	
Endowment miners' beneficial fund	20,000.00	
Coal agents—bad account	87,026.80	
Sundry consignment accounts not valuable	33,383.03	
Sundry coal and rent bills not valuable	34,297.28	
M. & M., rails sold and advances—bad account	337,142.06	
Sundry accounts due the company not valuable	144,800.11	
		8,217,345.49
Total		$12,431,585.12

"In the statement of Aug. 10, 1881, the aggregate of items then placed in profit and loss account was $15,426,-030.41. The difference between that statement and the present is in interest and other items written off against revenue.

"No attempt has been made to write off the difference between original cost and the actual value now of the stocks and bonds owned by the two corporations, nor of the loans and advances made to corporations and to individuals that are carried on the books as assets at their original cost. These properties should be carefully examined, separately, by experts and their present value ascertained, and the difference between original cost and such appraised valuation should be written off into profit and loss account. It is misleading to retain as an asset on the company's books property at an assumed value which it is evident is greatly in excess of real value."

BALANCE SHEET.

Dr.

	Nov. 30, 1881.	Nov. 30, 1880.	Increase.	Decrease.
Construction and equipment, Railroad Co	$45,308,742.06	$44,261,476.54	$1,047,265.52	
Cost of property, improvements, and equipment, Coal & Iron Co	54,435,165.93	54,796,125.63		$360,959.70
Real estate, Railroad Co	8,042,762.12	7,910,200.56	132,561.56	
Real estate, Coal & Iron Co	1,345,328.44	1,365,908.89		20,580 45
Stocks and bonds, Railroad Co	8,880,635.50	8,961,050.56		80,415.06
Stocks and bonds, Coal & Iron Co	5,244,855.69	4,839,855.69	405,000.00	
Advanced to branch roads of Railroad Co	2,452,480.68	2,535,335.52		82,854.84
Advanced to operators of Railroad Co	710,441.40	710 351.89	89.51	
Advanced to coal companies, Coal & Iron Co	1,451,674.55	1,302,638.00	149,036.55	
Cash, Railroad Co	677,127.17	467,236.35	209,890.82	
Cash, Coal & Iron Co	16,046.26	85,247.73		69,201.47
Paid to Receivers on account of preferred income bond subscriptions, Railroad Co	1,867,687.6[illegible]		1,867,687.65	
Bills and current accounts receivable, Railroad Co	1,558,850.62	1,288,576.42	270,274.20	
Bills and current accounts receivable, Coal & Iron Co	1,265,247.74	1,175,107.97	90,139.77	
Material and supplies, Railroad Co	1,186,658.15	1,027,000.11	159,658.04	
Material and supplies, Coal & Iron Co	250,583.49	554,991.05		204,407.56
Coal on hand, Coal & Iron Co	582,429.45	769,009.75		186,580 30
Iron ore on hand, Coal & Iron Co	3,135.50	9,565.50		6,430.00
Coupons and interest purchased, Railroad Co	774,220.00	241,360.75	532,859.25	
Funded coupons not matured, Railroad Co	469,953.50	1,381,896.00		911,942.50
Funded coupons not matured, Coal & Iron Co	57,015.00	170,205.00		113,190.00
Profit and loss, Railroad Co	4,214,249.63	4,356,828.28		142,588.65
Profit and loss, Coal & Iron Co	8,217,345.49	8,258,012.98		40,667.49
Charges to Coal & Iron Co. on Railroad Co.'s books	*54,370,778.85	*54,886,647.14		*515,868.29
	$149,052,626.02	$146,467,981.17	$4,864,462.87	$2,279,818.02

Cr.

	Nov. 30, 1881.	Nov. 30, 1880.	Increase.	Decrease.
Capital stock, Railroad Co	$24,383,175 28	$34,278,175.28	$105,000.00	
Bonded debt	77,541,358.67	77,702,722 04		$161,363.37
Bonded debt, Coal & Iron Co	15,016,523.31	15,185,556.67		169,033,36
Floating debt, Railroad Co	8,823,124.33	9,081,854.84		258,730.51
Floating debt, Coal & Iron Co	859,160.10	1,103,374.99		244,204.89
Receivers' certificates, Railroad Co	1,502,211.63	1,502,211.63		
Receivers' certificates, Coal & Iron Co	884,246.01	1,063,096.87		178,850.86
Arrears of interest, Railroad Co	2,019,099.41	1,394,469.41	624,630.00	
Arrears of interest, Coal & Iron Co	1,041,497.50	352,947.50	688,550.00	
Arrears of rentals, Railroad Co	1,098,605.32	1,009,101.59	89,503.73	
Current indebtedness, Railroad Co	2,290,514.28	2,034,083.83	256,430.45	
Current indebtedness, Coal & Iron Co	736,612.77	735,046.02	1,566.75	
Paid on account of deferred income bond subscriptions, Railroad Co	1,864,890.29		1,864,890.29	
Insurance funds, Railroad Co	488,375.24	421,805.07	66,570.17	
Sinking funds, Railroad Co	394,070.45	394,070.45		
Suspense account	100,152.43	209,465.98		100,313.55
Credits to Railroad Co. on Coal & Iron Co.'s books	*54,370,778.85	*54,886,647.14		*515,868.29
	$149,052,626.02	$146,467,981.17	$3,697,141.39	$1,112,496.54
Capitalized cost of leased properties	33,268,139.67			
Schuylkill Navigation Co	9,995,657 00			
Susquehanna Canal Co	5,101,056.58			
Catawissa Railroad Co	6,161,850.00			
Bonds and mortgages on real estate of leased lines	529,195.00			
Bonds of leased roads and Coal & Iron Co. guaranteed	5,981,400.00			
	$210,089,924.27			

* These figures are not included in the additions, for the reason that the amount appears on the Railroad Company's books as a charge for money advanced and on the Coal & Iron Company's books as a credit for money received, and bringing the two balance-sheets together it would naturally disappear, but it is retained in present form to show the actual cash advances of the Railroad Company for account of the Coal & Iron Company.

The report gives the following statement of the floating debt, with comments below:

	Nov. 30, 1881.	Nov. 30, 1880.	Nov. 30, 1879.
Floating debt, Railroad Co	$8,823,124.33	$9,081.854.84	$7,550,079.54
Floating debt, Coal & Iron Co	859,169.10	1,103,373.99	1,507,830.07
Receivers' certificates	2,386,457.64	2,565,308 50	
Arrears of interest	3,160,596.91	1,747,416.91	833,120.95
Arrears of rentals	1,098,605.32	1,009,101.59	717,947.37
Current indebtedness	3,027,127.05	2,769,129.85	2,691,206.19
Total	$19,255,080.35	$18,276,185.68	$13,300,184.12

"About $10,000,000 of the floating indebtedness of the company was, under the former management, secured by a pledge of $5,480,000 general mortgage, and $6,976,000 income mortgage bonds of the company, and $8,000,000 of Coal & Iron Company capital stock, with other stocks and bonds owned by the two companies, including those by which twenty-one affiliated corporations of the Railroad and Coal & Iron companies are controlled. The permanent control of these tributary corporations is vital to the Railroad Company, and it is of primary importance that this indebtedness shall be provided for, in such manner as to protect these hypothecated securities from ever again being placed in a position where they are liable to be sold separately, to satisfy notes and indebtedness for which they may be pledged as collateral. In order to secure this, an application has been made to the Court, for the company to issue floating indebtedness certificates to the extent of $10,000,000—the Receivers to indorse on the certificates an obligation to pay, from current revenue in excess of what shall be required for interest on liens prior to the general mortgage bonds, any difference necessary to make good current interest on the certificates, in case the dividends and interest that shall be collected upon the collaterals shall not be sufficient to provide for such interest promptly as it matures.

"By this arrangement these collaterals will be brought together and held by the Philadelphia Trust, Safe Deposit & Insurance Company, as trustee, thus avoiding the dangers of disintegration from forced sales by individual holders of the company's indebtedness in case of a money stringency or a disposition on the part of creditors to enforce their lien.

"This proposed arrangement of the Receivers, when carried out, will be of very great benefit to the company, and the managers have cordially joined with them in taking such action as was necessary to carry it into practical effect.

"In addition to current expenditures for operation, and the fixed charges for interest, rentals, sinking fund, etc., it will be necessary to provide during the current year,

For general mortgage scrip due July, 1882	$1,748,100.00
For Perkiomen scrip due July, 1882	100,890.00
For debenture guarantee and fractional scrip due July, 1882	3 310,569.00
For 7 per cent. loan, 1836-1882	134,400.00
For General Manager's estimate for equipment	1,608,100.00
For General Manager's estimate for structures	161,100.00
For steam colliers	231,.00.00
For canal improvements	22,500.00
For Chief Engineer's estimate for extraordinary expenditures on road-way, new stations and other structures	919,795.75
For Mining Engineer's estimate of expenditures, including proportion of $795,000 necessary to increase coal output 25 per cent	669,000.00
Total	$8,965,554.75

"These requirements are additional to what will be needed for the floating debt, Receivers' obligations and arrearages of interest and rentals."

The report speaks at much length of the circumstances attending the election of 1880; of the deferred bond scheme and of other plans proposed for settlement of the company's embarrassments.

An analysis of the Coal & Iron Company's expenditures shows:

That there has been expended:	
For coal and timber lands and leasehold collieries and for deadwork, colliery equipments and improvements, real estate and miners' houses, etc	$39,385,079.67
For stock and bonds and loans to secure control of tributary properties	5,672,393.58
For iron ore lands, iron furnaces, mills and other properties	1,720,566.20
For profit and loss account in working properties, including interest, payments, etc	22,454,500.80
For supplies and miscellaneous accounts	1,485,426 02
For bills and accounts receivable, cash, etc	2,608,701.92
Total	$73,326,668.19
Of which amount there was furnished by the Reading Railroad Company	$54,886,647.14
And the Coal & Iron Company obligations held by the public, for which the Railroad Company has become responsible as guarantor, amount to	14,929,556.67
Other direct liabilities of the Coal & Iron Company amount to	3,510,464.38
Total	$73,326,668.19

CONDITION OF ROAD.

"The Reading Railroad Company transports more tons of freight and more passengers per lineal mile of road than is carried by any other railway company in this country. For this reason, if for no other, the condition of its plant, and the general character of its maintenance and replacements, should be first-class in every respect, and of such a character as to secure the greatest economy in operation, as well as the safety and convenience of passengers and shippers in handling the vast traffic passing over its lines.

"The roadway and structures, machinery and rolling stock, have recently been examined by competent experts, Mr. T. E. Sickles, who was for three years the Chief Engineer and General Superintendent of the Union Pacific Railway, and is now its Consulting Engineer, and Mr. Frederick E. Sickles, a practical mechanical engineer, both of them men of large experience and recognized ability in railroad construction and maintenance, and in railway mechanics. Their reports, printed in the appendix, have been confirmed by a personal examination and inspection of a part of the railway lines by the company's officers. The examinations show that the embarrassed condition of the company has affected maintenance, and given character to its replacements. It is evident there has been but a meagre maintenance in all departments, and that of the roadway and structures, the replacements and improvements have not been of the most approved character for accommodating the volume of traffic, and for securing the greatest economy in working. The road-bed, ballasted as it is mainly with furnace cinder that packs into a compact mass, holding the sills firmly in place, is solid and substantial; and the bridges upon the main line, with a few exceptions, are permanent structures of stone or iron; but the metals and sills are not to the standard or quality they should be, especially upon the main lines.

"Upon the entire length of the company's main roads, 1,086.5 miles, there have been laid but 276 miles of steel rails; and while the character of the iron rails used, made mostly in the company's mills, is very good, they are not equal to steel rails in point of durability or economy, and in wearing they become spotted, offering a rough surface where steel rails wear smooth, and this materially increases the repair account for cars and machinery passing over them. The sills used in the main track are small and not of the usual specifications for a road with such a traffic, and there has been a scant maintenance, that, but for the solid character of the road-bed and ballast, would tend to weaken the track. The slight saving in original cost of metals and of sills us in replacement, is not economical, as it is more

than counterbalanced by an increase of repair accounts in other departments.

"Upon the branch lines—with the exception of the North Penn and Bound Brook, that have been more recently constructed—this forced economy is more marked than upon the main line.

TERMINALS.

"The terminal structures at Ninth and Green streets, where the principal passenger business is handled, and also at Broad street, are especially subject to criticism, both as to accommodations for the traveling public and the character of their construction and manner of maintenance. They seem to have been originally temporary structures, and were not constructed in accordance with a properly arranged ground plan, for buildings, tracks and accommodations necessary for present traffic and future requirements. The station at Ninth and Green was inadequate for the business of the old Philadelphia, Germantown & Norristown Railroad Company, and since the Delaware & Bound Brook and North Pennsylvania railroads have been brought there, it is in every way unsuitable. There should be for each of the terminals, full working drawings, with plans locating all permanent structures, tracks, platforms, etc., and all additions and replacements should, both in general character and all other respects, conform as far as practicable to such general plan, so that each year would bring it nearer to completion, and in time the original purpose would be carried out, and complete buildings and other structures, with convenient tracks substituted for the temporary structures and tracks now in use.

"Very complete plans were prepared for the station at Ninth and Green streets several years since, in 187–, but the present buildings, tracks and structures do not in any way conform to such plans. The explanation is that the city have refused to grant to the company necessary privileges on Ninth street, to make the improvements that are so greatly needed to accommodate the traveling public. Steps were taken by the company to secure additional ground on the west side of Ninth street, and some property was acquired, when further action was suspended because of the insolvency of the company.

"The passenger and freight station now in use on the east side of Broad street was originally built in 1856, as part of a general plan for station accommodations in that locality, and it has since remained in an unfinished condition. No recent estimates have been made for either of these terminal improvements, but steps should be taken at as early a day as possible to complete them both, or at all events to such extent as is absolutely required to properly accommodate the enormous traffic that centres at the two points.

"The Port Richmond accommodations for storing and handling coal are convenient and ample. The grain business is well provided for, and extensions can easily be made to meet increasing demands of the coal and grain trade. The company's property on the river front was wisely purchased, and in extent is sufficient to meet the present and any probable future wants, at least, for many years to come.

NEW CONNECTIONS.

"There are four important connections in the near future, which will prove of very great advantage to the Philadelphia & Reading Railroad Company.

"1. One via the Harrisburg & Potomac Road, when extended to Chambersburg. This road is now constructed from opposite Harrisburg to within about six miles of Chambersburg. Eventually it will be necessary to construct a short piece of road and a bridge across the Susquehanna River into Harrisburg, in order to make an independent connection with the company's Lebanon Branch. There is but little doubt of the early completion of a road from Pittsburgh eastwardly through Westmoreland, Somerset, Bradford and Fulton counties to Chambersburg, which will bring the Connellsville, Somerset and Salisbury coal basins into direct connection with the Reading Company's lines at Chambersburg, and will also furnish a through route between Philadelphia, New York and Pittsburgh.

"2. The Shenandoah Valley Road will furnish another important connection at Chambersburg. This road is completed from Hagerstown to a connection at Shenandoah Junction with the Baltimore & Ohio Railroad, and at Waynesboro with the Chesapeake & Ohio Railroad, and it is being rapidly extended 95 miles further south to a junction at Roanoke with the Norfolk & Western Railroad, which, through its alliance with the Virginia, Tennessee & Georgia Air Line, will make a direct and independent route to New Orleans and the Gulf.

"The probable completion, at an early day, of these two connecting lines, makes it necessary that arrangements should be made for the construction of a bridge across the Lehigh at Allentown, to connect your road with the Central Railroad, of New Jersey, in order to make a continuous line. Whether this bridge shall be constructed by your company alone, or jointly with the Central Company, is a matter that should be agreed upon by the officers that are to be chosen at the coming election.

"3. Another desirable connection is by way of Williamsport and the Jersey Shore & Pine Creek road. An extension of this line from Williamsport to Antrim, in Tioga County, will furnish a direct connection with the New York, Lake Erie & Western Railroad, at Corning and at Lyons, by the Syracuse, Geneva & Corning Railroad, with the New York Central Railroad, and other roads operated in that interest. The length of road necessary to be constructed to secure this connection is but 69 miles between Williamsport and Antrim. The great advantage of this connection to the Reading Company is, that it will open a new outlet for its production of anthracite coal to interior New York and to the lakes, by as direct and practicable a route as from any of the other coal fields.

"4. Another important connection will doubtless soon be made, by a new road now under construction between Baltimore and Philadelphia, and a portion of the Reading Company's road can be utilized in connection with this new road to make a through route to New York city from all Southern points.

"These connections will, when completed, not only bring new business to the railway, but will also furnish transportation facilities to new markets for the anthracite coal production of the company.

FINANCIAL SUMMARY.

"On Nov. 30, 1879, the floating indebtedness of both companies, including current liabilities, was $13,300,184.12. Six months from that date, on May 24 following, all the properties of both corporations, under an order of the Circuit Court of the United States, were placed in custody of three Receivers.

"The report made by the Receivers for the fiscal year ending Nov. 30, 1880, shows the floating and current indebtedness to have been on that date $18,276,185.68, and one year later, at the close of the fiscal year ending Nov. 30, 1881, the balance sheet shows it to be $19,255,080.85.

"It appears, therefore, that under the receivership this indebtedness has steadily increased. During the year just closed the expenditures of the Receivers and the accruing charges for rentals, guarantees, interest and sinking funds, exceeded the revenues derived from the property by at least $2,163,649.79.

"For the current year, in addition to current expenditures, there will be required:

For General Manager's estimates, a considerable portion of which is already contracted for	$1,829,100 00
For roadway improvements, Chief Engineer's estimates	919,715 75
For canal and navigation company improvements	22,500 00
For steam colliers	231,200 00
For mining expenditures, per Mining Engineer's estimates	170,000 00
For mining expenditures to increase capacity of output 25 per cent., per estimate of Mining Engineer—proportionate amount of $795,000 to be expended during two years	499,000 00
For scrip maturing July, 1882	5,159,559 00
For loan 1856-1882	134,400 00
Total	$8,965,554 75

"These amounts do not include any estimate of expenditures for steel rail replacements, nor for improved terminal facilities at Ninth and Green and Broad street stations, although very considerable expenditures should be made yearly, commencing with the current year, until these improvements shall be completed.

"Allowing the same proportionate increase in net revenue for the current year that there was during 1881 over 1880, after making proper allowance for equipment expenditures to cover general depreciation, it is evident that no material portion of this $8,965,554.75 can be provided for from the current revenues. Your board are satisfied there is but one way in which provision can be made for these expenditures and the maturing indebtedness of these corporations, and that is by the adoption of some plan of readjusting the finances of the companies, by which the fixed charges shall be brought within the limit of the earning capacity of the corporations, and they believe that this can only be done in one of two ways—

"First—By the junior creditors agreeing to forego a part of the fixed interest on their bonds, under some plan like that heretofore outlined and submitted by the board in August, 1881, the holders of certain junior obligations issued on leased property to consent to the temporary reduction of a portion of their fixed interest; or,

"Second—To submit to a foreclosure under either the general or the income mortgage, with an agreement for a reorganization, by which all the interests shall be protected in the order of their several priorities.

"This foreclosure plan is objectionable, because it may affect the special privileges conferred by the original charter of the company, and it will be likely to bring the new organization under the new constitution and the general state laws. It is also doubtful, if a forced disintegration of the properties, to some extent, at least, can be avoided in case of a sale under foreclosure proceedings.

RECOMMENDATIONS.

"In submitting this report to the shareholders, the managers have endeavored to make accurate statements in reference to the various properties of the company, their condition and revenue-producing capacity. They have not thought it necessary to discuss the wisdom of their original acquisition, by lease or purchase, or whether the leases and purchases were prudently made, and at fair rates or prices. The information they have obtained is generally submitted without other argument than the facts themselves carry.

"They think it proper, however, in closing to call special attention to some matters that have been referred to elsewhere, and to express their opinion as to what should be the policy of the company in respect to them—

"First—The policy of the Railroad Company in the maintenance of its roadway, structures and equipments, and as to expenditures for betterments and for terminal accommodations, has not been liberal for a company that transports a larger tonnage, and a greater number of passengers per lineal mile, than any railway in this country. This is not intended as reflecting upon the department officers immediately in charge of maintenance, as they have but carried out the policy of forced economies established by the former management, and in doing this, it is proper to state that they have apparently never enforced their economies beyond the safety point of maintenance. The forced economies they have been compelled to adopt have not, however, tended to secure an advantageous and economical working of the properties in their charge.

"Your board are clearly of the opinion that upon the company's main lines no further replacement of iron rails should be made, and that sills with a broader face should be used under all steel replacement; that the structures, including the Philadelphia terminals, should as rapidly as possible be improved; and they recommend that an amount equal at least to 5 per cent. of the original cost of locomotive and car equipment should be expended yearly in the purchase of new additional equipment, and charged currently to cost of operation, to cover general depreciation of the company's rolling stock.

"Second—It is very evident that with an output from the coal mines worked by the company of an average of but 3,638,027 tons during the past five years, and less than 4,000,000 of tons for the year just closed, that the company cannot rely for a sufficient revenue from its coal estates to provide for any material proportion of the yearly interest on their cost. During the past year of almost unprecedented prosperity in the coal trade, the reported net income of the coal company is only $40,667.49 in excess of the interest on its divisional purchase-money mortgages, which represent only about one-fifth of the actual cost of the properties. And this apparent excess is more apparent than real, as has been shown on a previous page. The estimated expenditures for increasing the output capacity of the mines worked by the company to 6,483,100 tons per annum, is $795,000, and to do the necessary work will take from 12 to 24 months. This expenditure cannot, however, be made so as to materially increase the capacity of production for the current year, nor for the year to come, but for 1884; with such increased capacity for production, if the mines shall be worked to 90 per cent. of their capacity, 5,834,790 tons of coal will be produced, which would be an increase of 2,196,763 tons, or 60.38 per cent. increase over the average output from mines worked by the company during the past five years, and 1,897,182 tons, or 48.18 per cent. increase over the output for 1881. Your board earnestly recommend that the expenditure for increasing production should be made. They also recommend that until such increased capacity of production shall be obtained, every exertion be made to bring production nearer to present capacity of output than seems to have been done in the past, the tonnage produced last year being but 74.51 per cent. of the present output capacity of the mines worked by the company.

"Third—The furnaces, iron ore mines, and iron mill properties should, in the opinion of your board, be disposed of as fast as purchasers can be obtained at proper prices. The legitimate business of your company is, first, transportation: and, second, coal mining. Your board do not think that the company should undertake any transactions outside of these two classes of business. As an investment, these furnaces, iron ore, and iron mill properties—except its rail mill at Reading—have not been profitable, and when worked by the company or for its account, they have generally proved still more unprofitable."

Lastly, the managers consider it evident that no plan can give permanent relief to the company which does not provide for a very considerable and permanent reduction in the interest charges upon the debt.

Philadelphia, Wilmington & Baltimore.

This company owns a line, all double track, from Philadelphia to Baltimore, 96.32 miles; a freight branch, 0.47 miles long in Philadelphia; the Port Deposit Branch from, Perryville, Md., to Port Deposit, 3.76 miles, and the Southern Division, from Delaware Junction to Rodney, Del., 11.40 miles, making 111.95 miles owned. It leases the Delaware Railroad and branches, 100.50 miles, but the earnings are not included. The 44th annual report covers the year ending Oct. 31, 1881.

Since the close of the last year a controlling interest in the stock has been acquired by the Pennsylvania Company, the transaction having been duly noted at the time.

The equipment consists of 86 engines; 112 passenger, 4 parlor, 21 smoking and baggage, 47 baggage, mail and express; 1 calf and 3 milk cars; 772 box, 8 refrigerator, 62 stock, 361 flat, 65 lime, 2 dump and 13 lumber-truck cars; 1 pay-car and 16 service cars. Increases during the year were 8 locomotives; 4 passenger, 3 smoking and baggage and 12 baggage, mail and express cars; 6 box cars and 1 service car.

The general account, condensed, is as follows:

Stock		$11,795,050.00
Funded debt		4,076,416.66
Accrued interest, vouchers, etc		274,649.92
Renewal fund		175,076.39
Profit and loss		1,165,816.55
Total		$17,487,009.53
Road, improvements and real estate	$13,878,284.24	
Securities of leased and controlled lines	2,758,592.77	
Sinking funds	116,000.00	
Materials	245 103.83	
Cash	489,028.64	
		17,487,009.53

Stock was increased $209,300 by exchange for convertible bonds. The funded debt consists of $31,500 convertible bonds; $3,500,000 mortgage bonds; $134,916.66 ground rents and land mortgages; $350,000 improvement bills payable and $60,000 ten-year notes given for Queen Anne & Kent stock.

The earnings for the year were as follows:

	1880-81.	1879-80.	Inc. or Dec.	P. c.
Passengers	$1,903,475.81	$1,767,219.20	I. $136,256.61	7.7
Freight and express	1,545,855.15	1,409,376.14	I. 136,479.01	9.7
Mail	73,408.33	58,257.43	I. 15,150.90	26.1
Rents, etc	29,141.23	28,257.73	I. 883.50	3.1
Total	$3,551,880.52	$3,263,110.50	I. $288,770.02	8.9
Expenses	2,320,799.35	1,896,887.37	I. 423,911.98	22.3
Net earnings	$1,231,081.17	$1,366,223.13	D. $135,141.96	9.9
Gross earnings per mile	31,727.38	29,134.92	I. 2,592.46	8.9
Net earn. per mile	10,996 71	12,198.42	D. 1,201.71	9.9
Per cent. of expenses	65.34	58.13	I. 7,21	

The large increase in expenses was due to the general increase in cost of labor and material and to increase of train service required to meet the necessities of traffic.

There was also an increase in repairs of stations and in renewals of road, in adition to the greater cost of the materials used. The renewal fund account was as follows:

Balance, Nov. 1, 1880		$199,663.59
Credited from net earnings of 1881		100,000.00
Total		$299,663.59
Expended on new bridges, buildings, signals, etc	$138,899.26	
Less insurance, property sold, etc	14,312.06	
		124,587.20
Balance, Nov. 1, 1881		$175,076.39

The increase in train mileage was largely due to the running of separate trains for some months for the Baltimore & Ohio, which for the time nearly doubled the service of through trains, without any increase in the passenger traffic.

The income and profit and loss accounts were as follows:

Net earnings, as above		$1,231,081.17
Interest, ground rents, etc	$242,989.93	
Less interest and dividends received	143,270.12	
Balance of interest	$99,719.81	
Dividends, 8 per cent	35,512.00	
Taken to renewal fund	100,000.00	
		1,135,231.81
Surplus for the year		$95,849.36
Balance of profit and loss, Oct. 31, 1880	$756 244.49	
Add credit accounts closed	66,552.67	
Add revaluation of securities	258,586.46	
Total	$1,081,383.62	
Depreciation, bad debts, etc	11.416.43	
		1,069 967.19
Balance, Oct. 31, 1881		$1,165,916.55

Included in the last item is the loss on the Delaware lease, which was $855.89 for the year.

The fruit traffic, which forms a considerable share of the business, was as follows for four years:

	1880-81.	1879-80.	1878-79.	1877-78.
Car-loads berries	839	509	636	771
Car-loads peaches	78	3,417	4,331	869
Total	917	3,926	4,967	1,640
Weight in tons	7,333	31,406	39,738	13,111
Total revenue	$50,315.27	$159,875.59	$238,453.32	$85,920.23
P. W. & B. share	21,430.90	99,100.54	123,541.08	40,948.01
Del. R. R. share	28,878.37	60,765.05	114,912.24	44,972.22

Last year the peach crop was almost an entire failure, the total shipments being less than those of one day in a good season. Berry shipments were good, and, indeed, the berry traffic fluctuates much less than that in peaches.

The locomotive mileage for the year was as follows:

	Main Line.	Southern Div.	Delaware R.R.	Total.
Passenger	1,294,720	34,002	147,317	1,476,039
Freight	1,000,264	43,550	172,080	1,215,903
Service	70,475	2,025	8,400	80,900
Total	2 365,459	79,586	327,797	2,772,842
Total, 1879-80	1,874,822	79,698	331,766	2,286,286
Inc. or dec	I. 490,637	D. 112	D. 3,969	I. 486,556

The only charges to construction are for new right of way and for additional real estate and new buildings in Wilmington; all other improvements have been charged to expenses. The new equipment, including 8 locomotives and 18 passenger cars, has also been charged to expenses. The road and equipment have been kept in excellent condition.

During the year the West Chester & Philadelphia Company, controlled, has been consolidated with the Philadelphia & Baltimore Central, also controlled The consoli-

dated road forms a second line from Philadelphia to Port Deposit, with a branch to West Chester. The stock owned of the new Philadelphia & Baltimore Central has been carried into the account at 60 and the bonds at 90.

Additions have been made to the shops at Wilmington and a new passenger station there has been begun. The improvements at West Wilmington and Bay View are nearly completed. A short branch is to be built to reach several large factories in Wilmington.

Since the close of the year the company has bought that part of the old Pennsylvania & Delaware road from Newark to Delaware City. It can be used to relieve the main line and as a cut-off for Delaware Division business to Baltimore.

Charlotte, Columbia & Augusta.

This company owns a line from Charlotte, N. C., southward to Columbia, S. C., and thence southwest to Augusta, Ga., 191 miles. It is controlled by the Richmond & Danville, and worked in connection with that company's system. The report is for the year ending Sept. 30.

The equipment consists of 20 engines; 8 passenger, 2 sleeping, 8 combination and 4 mail and express cars; 135 box, 8 stock, 56 flat and 9 caboose cars; 1 pay and 9 shanty cars.

The general account is as follows:

Stock	$2,578.000.00
Bonds	2,696,916.73
Bills. accounts and balances	270,583.03
Interest, etc	12,226.38
Profit and loss	127,656.31
Total	$5,685,382.45
Road and equipment	$5,181.984.70
Real estate	61.334.59
Stocks and bonds	294,895.30
Supplies	70,106.81
Balances receivable	27,636.98
Cash	49,424.07
	5,685,382.45

The bonded debt consists of $196,916.73 prior lien and sectional bonds; $2,000,000 first-mortgage and $500,000 second-mortgage bonds. The company holds $97,200 of its own stock and $162,500 of its bonds.

The traffic for the year was as follows:

Train miles:	1880-81.	1879-80.	Inc. or Dec.	P.c.
Passenger	223,058	240,232	D. 17.174	7.7
Freight	223,158	187,217	I. 35,941	19.2
Service and switching.	73,905	55,228	I. 18,677	33.9
Total	520,121	482,677	I. 37,444	7.8
Car miles:				
Passenger	970.118	904,649	I. 65,467	7.3
Freight	2,580,742	2,168,725	I. 412,017	18.9
Service	220,891	130,673	I. 90,218	68.9
Passengers carried	96,535	76,799	I. 19,736	25.6
Passenger miles	4,120,984	3,789,663	I. 331,321	8.8
Tons express	1,040	874	I. 166	19.0
Express ton miles	119,328	110,342	I. 8,986	8.2
Tons freight	167,126	131,298	I. 35,828	27.3
Ton miles	12,760,391	10,256,105	I. 2,504,286	24.4
Av. train load:				
Passengers, No	18.5	15.8	I. 2.7	17.1
Freight, tons	57.2	54.8	I. 2.4	4.4

The average passenger train last year was 4.3 cars; freight, 11.2 cars; 20.8 per cent. of the freight car mileage was of empty cars. Of the ton miles 59.5 per cent. were of south-bound freight. The cotton carried was 121,761 bales, an increase of 8,834 bales; or 7.8 per cent.

The freight traffic for the year was equivalent to 107.63 tons carried both ways daily over the whole length of the road.

The average rate per ton per mile was 0.21 cent less than in the previous year. The average rate per passenger per mile was, for through passengers, 3.339 cents; local, 4.656; commuters, 2.725; average of all, 4.029 cents, an increase of 0.064 cent.

The gross tonnage of all classes of freight was as follows:

	Passenger.	Freight.	Service.	Switching.
Mile-tons by engines	8,922,320	10,488,426	1,056,742	1,613.360
Mile-tons by cars	19,168.558	26,449,331	2,383,112	1,406,205
Total	28,090,878	36,937,757	3,439,854	3,019,565
Mile-tons of load	543,164	12,760,391	959,536	577,737
Total	28,634,042	49,698,148	4,399,390	3,597,302
Per cent. of load to total	1.9	25.7	21.8	16.0

The whole service was equivalent to the passage of 449,890 tons of trains and load over each mile of road during the year.

The earnings for the year were as follows:

	1880 81.	1879-80.	Increase.	P.c.
Freight	$419.000.01	$359,366.43	$60,433.58	16 5
Passage	169,865.01	152,623.25	17,241.76	11.3
Mail, etc	37,254.62	29,126.68	8.127.94	28.0
Total	$626.919.64	$541,116.36	$85.803.28	15 9
Expenses	395.937.86	356,549.43	39,388.43	10.9
Net earnings	$230,981.78	$184,566.93	$46,414.85	25.1
Gross earn. per mile	3,280.21	2,833.07	447.14	15.9
Net earn. per mile	1,209 53	966.32	243.01	25.1
Per cent of expenses	63.12	65.88		

The earnings show a very considerable increase, both gross and net. The net earnings were sufficient to meet all charges and leave a balance of $39,468.69, which was expended in improvements of the property.

The income and profit and loss accounts were as follows:

Net earnings, as above		$230,981.78
Interest on funded debt	$175,280.00	
" Augusta bonds	7,000.00	
" floating debt	9,233.09	
		191,513.09
Surplus for the year		$39,468.69
Sale of property, etc		16,248.08
Balance, Sept. 30, 1880		99,392.59
Total		$155,109.36
Settlement of old claims, etc	$16,487.81	
Stock in Cheraw & Chester	9,375.00	
Sundry items	1,590 24	
		27,453.05
Balance, Sept. 30, 1881		$127,656.31

During the year 1,700 tons of steel rails, and 93,041 new ties were used in renewal. There are now only 11.32 miles of the old stringer track left, which will be replaced during the current year. Trestles and bridges have been repaired and the road generally improved in condition.

The shops at Columbia have been enlarged and a number of new tools added. A contract has been made to do the repair work for the Columbia & Greenville road. Several cars and one locomotive were added to equipment, and two light locomotives sold.

The corps on the line were somewhat reduced by drought, indicating some decrease of local business for the current year. The through business has shown a steady gain for several years.

Pittsburgh & Lake Erie.

This company owns a line from Pittsburgh, Pa., to Youngstown, O., 68 miles, with a branch to New Castle, Pa., 2.4 miles long, making 70.4 miles in all. The following is a summary of the report for the year ending Dec. 31, 1881, presented at the annual meeting this week:

The equipment now owned by the company is as follows: 30 engines, 1,310 freight and coal cars, 30 passenger cars, 15 caboose cars, one wreck car. In addition to which the Imperial Coal Company has 123 coal cars, and the Little Sawmill Run Coal Company has 210 cars in the service.

The following additions were made during the year: 6 engines, 190 freight and coal cars, 3 caboose cars, one wreck car, 6 passenger cars.

The stock, bonds, etc., were as follows:

Stock		$2,050,000.00
Bonds (first-mortgage)		2,000,000.00
Real estate mortgages		105,843.12
Equipment notes		178,992.28
Temporary loans		225 000.00
Total		$4,649,835.40
Cost of property	$5,287,498.42	
Cash on hand	40,300.68	
		5,327,799.10
Excess of property		$677,963.70

During the year the sum of $115,800.17 was paid in on stock subscriptions, leaving $10,750 still due on this account. The real estate mortgages are payable in 1887, 1888 and 1893.

The earnings for the year were as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Freight	$832,023.35	$666,695.96	I. $165,327.39	24.8
Passengers	181,554.52	154,181.72	I. 27,372.80	17.8
Mail, etc	27,485.55	20,379.08	I. 7,106 47	35.0
Total	$1,041,063.42	$841,256.76	I. $199,806.66	23.7
Expenses	608,764.97	399,012.70	I. 209,752.27	52.5
Net earnings	$432 298.45	$442,244.06	D. $9,945.61	2.3
Gross earn. per mile	14,798.34	11,958.16	I. 2.840.18	23.7
Net earn. per mile	6,144.96	6,286.34	D. 141.38	2.3
Per cent. of exps	*58.40	47 70	I. 10.70	

The President's report says: "The net earnings (over interest paid) have been 14.2 per cent. upon the capital stock paid in, a result which, in view of all the circumstances under which the operations are carried on, is very satisfactory.

"We have, during the past year, declared and paid a scrip dividend of 10 per cent. to stockholders, payable at the will of the company and bearing 6 per cent. interest, and the condition of the company warranting the same, we would recommend to our successors to issue a similar scrip dividend of same amount (10 per cent.) out of the net earnings of the past year."

The income account was as follows:

Net earnings, as above		$432,298.45
Interest on bonds	$120,000 00	
" other debt	20,635.02	
		$140 635.02
Net balance		$291,663.43
Increase of temporary loans		195,000.00
Sale of real estate		53,175.00
Payments on stock subscriptions		115,800.17
Total		$655,638.60
Paid for right of way and real estate	$89,916.92	
Construction	183,805 61	
Equipment	131,215.92	
Bills payable paid	250,700.15	
		655,638.60

The amount charged to equipment was paid in cash for new engines and cars. The reduction of bills payable was by payment of notes given for equipment. Of the equipment notes remaining which fall due in 1884 and 1885, $65,800.80 have been anticipated and paid, leaving the amount unpaid as follows: Due in 1882, $64,488.72; due in 1883, $64,488.72; due in 1884, $31,588.32; due in 1885, $18,426.52. Total, $178,992.28.

A number of new stations along the line were built and extensive improvements made to the property in Pittsburgh and elsewhere. The road and track have been much improved, two miles of second track and 6,228 ft. new sidings built.

The General Manager's report says: "The volume of business during the year has fully taxed the single track, and it has been limited to the extent of our terminal facilities at Pittsburgh and Youngstown. The second track from Pittsburgh to Stoop's Ferry, and from Edenburg to Youngstown should be laid during the year. Additional tracks and facilities for the prompt handling of trains should be made at Youngstown, and for loading and unloading freight at Pittsburgh.

"The increased revenues of the company have been made, notwithstanding a decrease of 12½ per cent. in the rates received from ore and from 20 to 25 per cent. in miscellaneous freights, and an increase in the wages of employés of 14 per cent. In addition to this the line was interrupted by freshets and slides seven days during the months of June and November, thereby decreasing the volume of business and largely increasing the expenses to restore and reopen the line. Perhaps the greatest and most unexpected embarrassment of the freight traffic was occasioned by the delay in delivering freight at Pittsburgh, through the effect of the horse disease, which prevailed for nearly two months. Notwithstanding these unfavorable circumstances, it is gratifying to state that the gross revenue increased $199,806.66.

"The cost for the removal of slides, protecting embankments and a large proportion of the cost of permanent track in the Ohio River at Pittsburgh have been charged to repair account."

LOCOMOTIVE RETURNS, AUGUST, 1881.

Master Mechanics of all American railroads are invited to send us their monthly returns for this table.

Name of Road.	Miles operated	Locomotives in service	Mileage. Total	Mileage. Average per engine.	Miles Run To. Ton of coal	Miles Run To. Cord of wood	Miles Run To. Pint of oil	Average Train. Passenger cars	Average Train. Loaded freight cars.	Cost in Cents per. Passenger car mile.	Cost in Cents per. Freight car mile	Cost per Mile in Cents for. Repairs	Fuel	Stores	Miscellaneous	Engineers, firemen and wipers	Total	Average Cost of. Coal, per ton	Wood, per cord
Allegheny Valley, River Div.*	139	37	97,212	2,627	34.22	.....	22.54	3.90	22.20	3.838	0.954	8.28	4.04	0.48	.....	6.38	19.18	$	$
Low Grade Div.*	120	20	49,169	2,458	34.61	.....	19.18	2.60	22.20	3.169	0.551	3.45	3.41	0.59	.....	6.34	13.79	.....	.....
Grand Pacific, Western Div.†	200	27	87,639	3,246	55.78	.....	17.68	.....	.....	.....	.....	4.41	11.72	0.50	0.32	7.14	24.09	6.75	5.00
Northern & San Pablo Divs.†	104	34	91,452	2,778	37.72	.....	17.5:	.....	.....	.....	.....	6.59	17 94	0.52	0.32	7.87	32.54	6.75	5.00
Visalia Div.†	157	15	42,919	2,861	38.97	.....	19.22	.....	.....	.....	.....	5.89	20.23	0.45	0.04	7.43	34.14	6.75	5.00
Tulare Div.†	170	14	36,084	2,577	39.38	.....	20.39	.....	.....	.....	.....	7.82	25.11	0.47	0.47	7.47	41.34	10.00	5.00
Los Angeles, San Diego, Yuma & Wilm. Divs.†	416	34	105,620	3,018	49.14	.....	16.0(	.....	.....	.....	.....	3 51	20.18	0.57	0.32	7.32	31.90	10.00	5.00
Gila & Tucson Divs.†	555	48	114,745	2,391	59.21	.....	14.57	.....	.....	.....	.....	4.41	16.79	0.62	0.47	7.79	30.08	10.00	5.00
California Pacific Div.†	179	12	33,228	2,772	36.48	.....	26.46	.....	.....	.....	.....	3.05	18.59	0.37	0.60	7.35	29.96	6.75	5.00
Stockton & Copperopolis†	49	4	6,921	1,730	.....	51.84	27.91	.....	.....	.....	.....	14.09	9.64	0.31	0.: 6	5.96	30.27	.....	5.00
Sacramento Div.†	119	43	106,626	2,480	.....	25.03	20 32	.....	.....	.....	.....	9 99	19.97	0.44	0.32	8.87	39.59	.....	5.00
Oregon Div.†	151	7	25,577	3,654	.....	45.51	22.28	.....	.....	.....	.....	1 63	10.9	0.43	0.09	6 87	20.00	.....	5.00
Truckee Div.†	205	26	81,953	3,152	32.81	88.48	18.42	.....	.....	.....	.....	9.31	19.39	0.47	0.34	8.32	37.84	6.75	5.00
Humboldt Div.†	300	18	56,429	3,134	42.23	.....	12.76	.....	.....	.....	.....	5.50	16.01	0.41	0.32	7.71	32.95	6.7	5.00
Salt Lake Div.†	219	30	10,811	3,027	32.38	.....	14.70	.....	.....	.....	.....	7.96	20.99	0.60	0.21	7.16	35.95	6.75	5.00
Chi. & Eastern Ill., Main Line‡	160	52	118,530	2,825	34.00	.....	14.00	.....	43.66	.....	.....	3.10	4.50	0.40	.....	.....	5.50	13.50	.....	.....
Terre Haute Div.‡	65		28,390	2,825	36.00	.....	16.00	.....	31.96	.....	.....	5.60	4.40	0.40	.....	4.6	15.0	.....	.....
Cleveland & Pittsburgh*	225	86	227,845	2,650	50.46	.....	17.95	4.50	17.50	2.986	0.872	4.03	3.03	0.54	1.88	6.37	15.85	1.44	3.00
Cleve., Tus. Val. & Wheeling.	158	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware, Lacka. & Western, Bloomsburg Div.‡	80	27	77,417	2,867	.....	.....	23.89	.....	.....	.....	.....	2.39	.....	0.61	.....	.....	4.56	7.56	.....
Erie & Pittsburgh*	98	29	82,327	2,837	42.59	.....	17.19	3.70	17.60	2.459	0.842	3.31	4.12	0.59	1.08	6.51	15.61	1.77	1.77
Grand Rapids & Indiana	332	41	130,817	3,110	41.42	39.46	16.27	.....	.....	.....	.....	2 49	7 90	0.52	3.39	5.52	19.82	3.52	2 50
Illinois Central, Chicago Div.‖	365	97	260,639	2,687	35.85	.....	14.87	4.65	21.32	.....	.....	3.55	4.69	0.31	.....	5.8(	14.35	1.60	3.25
Middle Div.‖	101	17	17,854	1,050	38 99	.....	22.66	1.75	14.00	.....	.....	1.37	4 24	0.21	.....	4.8(	10.67	1.60	3.25
North Div.‖	345	56	142,394	2,543	29.75	.....	12.92	3 82	14.54	.....	.....	3.70	5.59	0.36	.....	5.06	15.31	1.60	3.25
Springfield Div.‖	113	11	32,220	2,929	36.00	.....	14.80	1.65	13.68	.....	.....	2.01	4.11	0.37	.....	5.20	11.75	1.40	3.00
Iowa Div.‖	401	44	133,297	2,802	32.13	.....	15.65	4.43	12.84	.....	.....	3.33	7.37	0.31	.....	5.84	16.75	2.33	5.00
Jeff., Madison & Indianap.*	226	41	125,695	3,017	41.00	.....	15.95	3.43	22.82	3.850	0.740	3.34	6.51	0.52	1.88	5.81	17.86	2.57	2.50
Kan. City, St. Jo. & Coun. Bl¶	247	38	130,741	3,441	49.10	.....	23.00	3.80	18.40	.....	.....	3.46	4.70	0 30	.....	5.90	14.36	2.30	3.50
Lake Shore & Mich. Southern, Buffalo Div.‡	.....	81	266,006	2,543	37.72	66.60	25.32	.....	.....	.....	.....	4.12	7.08	0.27	.....	.....	6.07	17.56	2.60	5.69
Erie Div.‡	.....	118	304,939	2,584	37.90	.....	26.80	.....	.....	.....	.....	4.82	6.23	0.30	.....	.....	5.77	17.12	2.27	5.43
Toledo Div.‡	.....	98	204,241	2,127	28.86	65.82	15.54	.....	.....	.....	.....	4.53	9 28	0.42	.....	.....	6.59	20.82	2.67	4.08
Mich. Southern Div.‡	.....	218	585,642	2,702	39.81	77.74	19.28	.....	.....	.....	.....	3.98	7.81	0.32	.....	.....	5.9(	18.0	3.10	4.63
Mahe R'y. Miss. Riv. & Texas.	155	10	28,718	2,872	.....	61.00	7.99	.....	.....	.....	.....	1.75	3.67	0.00	2.08	0.64	7.54	4	2.25
Louisv'e & Nash., First Div.**	435	58	164,779	2,831	31.5*	.....	9.98	4.65	18.18	3.250	1.220	3.10	6.04	0.42	1.43	6.51	17.50	1.87	2.26
Second Div.**	200	39	73,417	2,447	31.70	.....	16.62	4.09	15.09	2.790	1.120	2.45	5 30	0.32	1.73	6.54	16.35	1.65	2.55
Memphis Div.**	139	15	44,082	2,979	36.43	.....	11.11	4.31	14.24	3.470	1.460	4.17	6.23	0.37	1.5	6.06	18.38	2.24	2 0
Nash. & Decatur Div.**	122	2	63,768	3 153	31.99	.....	16.16	3.88	18.71	4.580	1.430	7.61	5.92	0.27	1.66	6.34	21.80	1.12	2.30
South & North Ala**	189	40	97,044	2,426	29.14	.....	15.11	3.89	13.65	3.710	1.300	3.74	6.41	0.25	0.9	6.23	17.06	1.80	2.50
Mobile & Montgomery**	180	3	63,091	1,972	37.00	.....	14.57	5.88	14.95	3.330	1.410	7.55	7.91	0.31	1.24	6.2:	23.26	2.80	2.50
St. Louis Div.**	207	31	82,499	2,661	47.31	.....	13.81	3.16	14 08	3.280	1.280	4.31	5.17	0.59	1.58	5.80	17.45	1.85	1.50
Ev., Hen. & Nash. Div.**	135	23	68,861	2,602	28.33	.....	14.71	2 70	14.45	7.940	1.450	6.12	4.64	0.30	1.55	6.25	18.89	1.27	1.75
New Orleans Div.**	141	27	68,392	2,533	37.47	.....	11.03	5.74	23.01	3.210	0.970	3.02	7.25	0.36	0.93	5.9(	17.44	4.14	1.00
Pensacola & Selma Divs.**	134	24	23,371	974	38.51	.....	11.68	.....	8.11	.....	2.840	6.06	5.12	0.49	1.51	7.27	2 45	2.80	1 75
Marquette, Hough. & Ont	88	22	68,494	2,362	45.06	.....	22.53	.....	45.70	.....	.....	1.39	9.76	0.46	.....	.....	5 58	17 19	4.2(	.....
N. Y., Pa. & O., Eastern Div.	225	85	260,806	3,069	31.24	.....	13.27	6.10	22.60	.....	.....	3.50	6 65	0.6(	.....	.....	6.23	16.98	2.12	2.72
Western Div.	197	60	203,45)	3,391	25.88	.....	21.45	7.40	18.40	.....	.....	3.78	7.71	0.38	.....	.....	5.84	17.71	1.94	2.72
Mahoning Div.	141	58	167,251	3,156	42.17	.....	18.00	4.00	25.00	.....	.....	3.98	4.49	.....	.....	.....	5.91	14.38	1.91	2.72
No. Cent. Ry. & Can. Divs.	147	49	128,310	2,619	30.35	.....	18.55	.....	.....	.....	.....	5.88	2.28	0.49	.....	.....	6.2(	17.80	1.6	1.04
Ohio Central	213	38	113,190	3,777	34.92	.....	19.66	.....	.....	.....	.....	2.29	3.38	0.37	.....	.....	5.19	11.23	.....	.....
Pennsylvania, N. Y. Div.††	120	129	482.3.5	3,352	34.18	.....	9.54	.....	.....	.....	.....	5.00	9.40	0.90	.....	.....	.....	15.30	3.2	3.84
Amboy Div.††	204	51	118,742	2,317	48.25	.....	14.01	.....	.....	.....	.....	4.30	6.70	0.60	.....	.....	.....	11.60	3 20	3.86
Belvidere Div.††	80	41	77,480	1,890	35.56	.....	10.64	.....	.....	.....	.....	3.80	9.10	0.7(	.....	.....	.....	13.60	3.2	3.85
Philadelphia Div.††	206	147	485,235	3,3 1	26.74	.....	12.63	.....	.....	.....	.....	11.60	4.70	0.70	.....	.....	.....	17.0	1.2	2.72
Middle Div.††	132	102	341,156	3,345	24.57	.....	14.24	.....	.....	.....	.....	6.9(	5.10	0.60	.....	.....	.....	12.60	1.2	2.72
Altoona Div.††	56	23	51,098	2,244	42.27	.....	15.89	.....	.....	.....	.....	5.20	3.00	0.50	.....	.....	.....	8.7(	1.20	2.73
Pittsburgh Div.††	172	164	570,098	2,942	26.10	.....	11.79	.....	.....	.....	.....	5.10	4.60	0.70	.....	.....	.....	10.40	1.20	2.72
Tyrone Div.††	127	39	97,591	2.50	21.31	.....	16.18	.....	.....	.....	.....	4.20	5 70	0.50	.....	.....	.....	10.40	1.2(	2.73
West Penn. Div.††	104	23	51,897	2,256	33.52	.....	34.48	.....	.....	.....	.....	6.80	3.70	0.30	.....	.....	.....	10.80	1.2(	2.72
Lewistown Div.††	63	8	21,170	2,646	5.97	.....	18.52	.....	.....	.....	.....	5.7(	4.70	0.50	.....	.....	.....	10.90	1.2(	2.71
Bedford Div.††	57	7	14,971	2,139	30.48	.....	22.52	.....	.....	.....	.....	1.00	4.00	0.40	.....	.....	.....	5.4(	1.20	2.89
Frederick Div.††	109	11	23,563	2,142	32.38	.....	21.01	.....	.....	.....	.....	1.50	3.90	0.30	.....	.....	.....	5.90	1.20	2.73
Monongahela Div.††	54	11	28,024	2,518	41.78	.....	14.45	.....	.....	.....	.....	3.90	2.70	0.50	.....	.....	.....	7.1(	1.20	2.89
Pitts., Ft. Wayne & Chicago, Eastern Div.*	383	146	491,413	3,363	40.16	.....	18.49	5.20	17.10	2.198	0.815	1.91	4.01	0.53	1.49	6.38	14.32	1.61	1.61
Western Div.*	280	119	427,367	3,591	38.9(	.....	19.95	6.70	23.30	2.564	0.672	3.88	3.94	0.33	1.93	6.67	16.10	1.53	1.53
Pitts., Cin. & St. Louis, Little Miami Div.*	197	39	120,430	3,088	46.64	.....	13.29	4.96	18.16	2.430	0.979	4.20	5.02	0.56	2.12	6.02	17.92	2.25	2.00
P., C., & St. L. Div.*	247	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Toledo, Del. & Burlington‡‡	370	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wabash, St. L. & Pacific, Peoria & Iowa Div.	686	91	338,966	3,746	31.44	.....	13.52	.....	.....	.....	.....	3.15	5.03	0.44	.....	6.48	15.10	1.50	1.50
West Jersey††	163	29	86,996	2,999	33.11	.....	11.68	.....	.....	.....	.....	13.30	12.10	0.60	.....	.....	26.00	4.00	4.17

* Five empty cars rated as three loaded ones.
† Switching engines allowed 6 miles per hour; helping engines, actual distance run.
‡ Switching engines allowed 6 miles per hour.
‖ Fuel not estimated.
¶ Two empty cars rated as one loaded one.
‖ Three empty cars rated as two loaded ones.
** Switching engines allowed 6 miles per hour; five empty cars rated as three loaded ones.
†† Engineers', firemen's and wipers' wages not included in cost.
‡‡ Gauge of this road, 3 ft.
The ton of coal is 2,000 lbs., unless otherwise noted; 25 bushels counted to the ton.
Repairs generally include all shop expenses.

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DIFFERENCES IN RATES TO SEABOARD PORTS.

There have been for two or three weeks past many rumors of an approaching settlement of the railroad war, especially among stock speculators, who at last seem to appreciate the gravity of the situation and the immense destruction of profits accompanying the contest. So far as appears, however, the various recent reports of a settlement or negotiations for a settlement have been founded only in the hopes of certain interested parties, and in the conviction, which is fully justified, that the persons responsible to the stockholders of the different companies will not suffer an indefinite continuance of the struggle. In railroad wars, as in other affairs, we may judge the future by the past. There has never been a trunk-line war that lasted an entire year; and we have seen that the losses during the half-year of the present contest have been such as to bring more than one company close to the line which separates it from insolvency. No responsible officer, we may be sure, will carry his obstinacy so far as to seriously impair the credit of his company; before that point is reached he will at least submit to arbitration, even if he does not directly surrender the points for which he is contending. This is but another way of saying that in a railroad war, as in a war of nations, we may be sure that the end will be peace and not the annihilation of any of the contending parties, and that peace is nearest when the situation of one or all of the contending parties is most desperate.

It must be confessed, however, that there are circumstances which make it unusually difficult for the parties in this contest to come to an agreement. If it were now what it appeared to be when it broke out, a contest of the New York Central to recover lost ground, to take back by force what had been taken from it (in part) by stealth, it would not be so difficult. The New York Central, though it has not had so large a proportion of the grain traffic during the railroad war as for several years previous (as we show elsewhere this week), has had a much larger proportion than in the first five months of the year, and probably as much as, under the circumstances, it is likely to command, and it has certainly inflicted very severe punishment on those by whose unfair practices (as it charges) its traffic was diverted so largely last spring. If it is possible by inflicting losses to teach the danger of violating agreements, the lesson has been most thoroughly taught during the past six months.

But since the war began the ground of the contest has been shifted. Occasioned by violation of an old agreement, Mr. Vanderbilt declares that it was continued for the purpose of bringing about a change in another old agreement, and that the point contended for now is equal rates between Western competing points and the four seaboard cities, New York, Philadelphia, Baltimore and Boston. The Pennsylvania and the Baltimore & Ohio authorities declaring that this is inadmissable, there seems to be no ground left for negotiation; and as the commercial exchanges of New York heartily indorse Mr. Vanderbilt's position, and those of Philadelphia and Baltimore, of course, join the Pennsylvania and the Baltimore & Ohio in declaring it inadmissable, the railroad companies have, as it were, taken their terminal cities into the fight, and will find it hard to make a peace which their merchant allies do not indorse; and these, we may be sure, having everything to gain and nothing to lose by adhering to their position (the losses all falling upon the railroads), will be loath to consent to any settlement which does not give them what they claim, and all that they claim. The only way out seems to be an arbitration, and though the railroads may accept the decision of arbitrators, the merchants of the different cities will certainly protest against it, whatever it may be. One or more of the seaboard cities is almost sure to be offended by the terms of the peace, when it does come.

Yet, if any have a right to be dissatisfied with the present condition of things, it is the railroads and not the cities. We showed a week ago that the distribution of grain receipts among the four cities during several years past has not been such that the New York merchants have any right to complain of it; and there has been no complaint, we believe, from the other cities. Their grain traffic has often increased in greater proportion than the New York traffic, but New York has gained much more in quantity than any other city. Of an increase of 131,000,000 bushels of grain and flour receipts at New York, Philadelphia and Baltimore from 1875 to 1880, 75,000,000 went to New York, and the difference in 1881 was much more in favor of New York. In the same time there was an increase of 84,000,000 bushels in the exports of New York, and of 62,000,000 in those of Baltimore and Philadelphia. The city of New York, it seems to us, can afford to be content with such a result; but it does not follow that the New York railroads have nothing to complain of. To them the primary question is not how much traffic New York gets, but how much they get, and as New York has immense receipts by water, the two questions are not one, by any means. It will not satisfy the New York railroads if three-fourths of the grain goes to New York, if they get none of it and the railroads to Philadelphia and Baltimore carry the other quarter. They fight for business for themselves, and we must not expect them to be content without a fair share of the grain that goes to the seaboard by rail.

Whether they get such a "fair share" or not it is not possible to ascertain by a comparison of the seaboard receipts, because there is no road except the Baltimore & Ohio that does not carry to more than one seaport, and no seaport that does not receive by more than one road. Last year more than half the grain that went to Baltimore was carried thither by the Pennsylvania's Northern Central road (which carries what the Vanderbilt roads ship to Baltimore, besides the Baltimore shipments of Pennsylvania's line). Philadelphia receives from the Erie and the New York Central, as well as from the Pennsylvania, and in 1880 the two New York roads supplied a very large part of the Philadelphia receipts. Three trunk lines and also the canal carry to New York, but here we are able to separate the receipts by the different routes. Boston receives much from the Grand Trunk and a not inconsiderable (and increasing) quantity from the Pennsylvania and the Erie, besides the very large amount brought by the New York Central and the Boston & Albany.

It is not a matter of indifference to the roads, however, to which place they carry grain. Only the Pennsylvania is able to deliver by its own lines at New York, Philadelphia and Baltimore alike; the New York Central gets but a very short haul on what it ships to Philadelphia, and the Erie only about half as long a one as on shipments to New York. The New York Central gets a larger proportion of the rate on shipments to Boston than any other trunk line except the Grand Trunk, but not nearly so much as on shipments to New York. Roughly speaking, we may say that it is to the advantage of the Baltimore & Ohio that all grain should go to Baltimore; to the Pennsylvania it is not important whether it goes to Baltimore, Philadelphia or New York: it is able to carry it to either place over its own roads; the Erie will do best to have all grain go to New York, and so will the New York Central, though it does well with Boston receipts, especially as it has (at present) a much larger share of these receipts than of those at New York; the Grand Trunk makes little out of grain going to places other than Montreal, Portland and Boston.

Now rates which prevent grain from going to Baltimore are of course a grievance to the Baltimore & Ohio and an advantage to the roads to New York, which will be measured by the addition which they give to their total earnings from grain. What diverts grain from Philadelphia to New York will not trouble the Erie and the New York Central, though they carry to Philadelphia, because they carry a larger proportion of what goes to New York and get but a short haul on Philadelphia traffic. It would not be bad for the Pennsylvania but for the fact that it gets but (in 1881) 18 per cent. of what goes to New York by rail, and probably two-thirds of what goes to Philadelphia. It would, however, doubtless, get more than 18 per cent. of any grain diverted from Philadelphia to New York, as what it carries to one place it is more likely than any other road to carry to any other place which it reaches if the destination of the freight is changed. To discuss the subject intelligently, we should know not simply how much grain each seaboard city has received, but how much each trunk line has carried. This we cannot learn from any published statistics, though the figures have doubtless been kept in Mr. Fink's office for two or three years past. We know how much each road brought to New York, but not the division of the receipts at the other places. Judging by its share of the New York receipts, it would appear that the Pennsylvania has much less traffic than its position should command—usually not one-third as much as the New York Central and but about half as much as the Erie; but when we find that last year, besides the 16,500,000 bushels it brought to New York, it delivered 22,000,000 bushels at Baltimore and probably 19,000,000 at Philadelphia, the circumstances are changed; 57,500,000 bushels seems a pretty good share for one trunk line to have out of a total of about 197,500,000 bushels of grain and flour brought by rail to the four seaboard cities—29 per cent. of the whole. The Baltimore & Ohio's 18,000,000 delivered at Baltimore, on the other hand, considering that it brings no considerable amount to any other places, seems hardly worth notice. The 42 millions brought to New York by the New York Central does not compare well with the Pennsylvania's total, but if it brought two-thirds of the 31,500,000 of Boston receipts, and a half or a third of the 9,500,000 bushels not credited to the Pennsylvania at Philadelphia, it had from 66 to 68 millions in all, and 33⅓ to 34½ per cent. of the entire rail traffic. The Erie, in addition to its delivery of 34,000,000 bushels at New York, probably carried a few millions of bushels to Philadelphia and Boston.

It may be argued, however, that a road is entitled to more traffic if it carries to many places; that if there are three roads and three termini, one road reaching all the termini, the others only one each, the first, if otherwise equal, is entitled to one-third of the traffic at each termini. There is something in this, but not so much as may appear at first sight. By far the larger part of the grain traffic—that carried for export—is *one* traffic, whether it goes by way of Boston or Baltimore. The part consumed at the Atlantic seaboard is a very different thing. No road can demand a share of the 40,000,000 bushels consumed yearly at New York unless it carries to New York, or of the 17,000,000 consumed at Philadelphia unless it carries to Philadelphia.

But if we can agree upon the share of the *export grain* that each trunk line shall carry, it seems to us that we shall have gone far towards a settlement of the whole question. The rates which will secure such a distribution should be satisfactory rates. If with equal rates to all ports traffic should desert Baltimore and Philadelphia, then the Baltimore & Ohio and the Pennsylvania would not get their due proportion, and differences would have to be made.

The strongest argument for the New York Central's position has been the course of *rail* grain receipts at the different cities. It was very satisfactory to New York that in 1880, with rail rates well maintained, it received 5,900,000 bushels more than in 1879, while Philadelphia and Baltimore received 4,300,000 less; but it was not satisfactory to the New York railroads that their business fell off 6,500,000 bushels in 1880, and that New York's gain was wholly by reason of an increase of 12,400,000 bushels in canal receipts. Down to 1881, indeed, the course of *rail* receipts of grain was more favorable to Philadelphia and Baltimore than to New York, and it was only last year that there was a great change in the other direction. Witness the following table of receipts by rail only:

Receipts of Grain and Flour by Rail, in Bushels.

	New York.	Philadelphia and Baltimore.
1875	50,105,667	50,243 899
1876	62,921,670	70,*57,121
1877	50,892,967	60,317,563
1878	85,350,079	92,549,890
1879	101,929,243	114.198,381
1880	95,414,822	109,886,589
1881	93,715,000	*72,265,000

* Partly estimated.

In 1875 New York received by rail 6,140,000 bushels

more than the other two cities, but less in every year since until last year, and in 1880 14,470,000 bushels less. With three great trunk lines carrying to New York and only two (to a large extent) to Philadelphia and Baltimore, it seems that New York should have done better, and that the New York roads were not getting their due share of the grain traffic, however it might be with New York city, which received 73,778,000 bushels by water in 1880.

In this connection it would seem that the experience of the Pennsylvania Railroad with the rates to the different cities ought to be most instructive. It carries to New York, Philadelphia and Baltimore alike over lines in its own control, and from Chicago and most of the other chief grain markets of the West it has the shortest line to all these places. How, then, have the shipments over its road been distributed? If the differences in rates have been altogether equitable, why has it carried so much more to Philadelphia and Baltimore than to New York? Are these differences explained by the local consumption at Philadelphia and Baltimore? We find, estimating its share of the Philadelphia receipts, that in 1881 it carried 22,000,000 bushels to Baltimore and 19,000,000 to Philadelphia, and but 16,500,000 to New York, and there was a large increase in its share of the New York business and a large decrease in the total Philadelphia receipts that year. We must take from the 22,000,000 bushels brought to Baltimore by the Northern Central the amount delivered to it by the New York Central it is true, but that cannot be a very large amount, and it remains true that this last year, when its share of New York business was the largest for many years, it brought more to either Philadelphia or Baltimore than to New York. The difference in favor of Philadelphia last year may well be explained by the local consumption there, its share of which would probably be 10,000,000 to 14,000,000 bushels; while its share of the New York consumption would not be more than 5,000,000, so that we may say that it brought for export considerably more to New York than to Philadelphia. But this is not true of Baltimore, nor was it true of Philadelphia before 1881. Is that a fair difference in rates which causes a road, able to carry to the three ports equally well, to carry nearly twice as much to Baltimore for export as to New York?

It does not concern the other railroads particularly, however, to what places the Pennsylvania carries its grain, provided that it does not get too large a share of the total business, which must be judged more by its command of connections in the West than by its facilities at its Eastern termini; but the actual working on this road of the differences in rates to those termini is of much significance in deciding the propriety of maintaining those differences.

Neither New York nor the New York railroads can complain of the rail grain movement in 1881, however. The rail deliveries were then but 1,700,000 bushels less than in 1880 at New York, while at Philadelphia and Baltimore they were 37,600,000 bushels less.

A large part of the change, certainly, is due to the fact that by reason of the low rates the railroads carried to New York several millions of bushels that otherwise would have gone by canal. Further, in the last half of the year, the country from which Philadelphia and Baltimore usually receive a very large part of their receipts had much less grain to ship than usual, or than the country farther north, which has always sent comparatively little grain to those places. And it is quite probable, as the New York Central claims, that the actual rates to New York during the railroad war have been much nearer the Philadelphia and Baltimore rates than heretofore. While the Baltimore & Ohio and the Pennsylvania have nominally maintained the usual differences, yet, rates being irregular, and they not being anxious to make a showing of a large traffic if it had to be taken at less than cost, we may suppose that they have taken the best rates they could get for Philadelphia and Baltimore shipments, and when they could not get New York freight at rates two and three cents higher have been perfectly willing to go without the New York freight. At Philadelphia, especially, there is a large consumption of grain, and for all this it would probably be perfectly easy to obtain even more than the New York rate. When rates are extremely low, it must be remembered, the rate *per mile* to Philadelphia is much less than to New York. Just at present, for instance, when $2 a ton is paid for carrying from Chicago to New York, the Pennsylvania receives one-fifth less (at the usual difference) for carrying one-tenth less distance. Last year at this time, when the rate to New York was $7 per ton, it received not 6 per cent. less for the shorter haul. For carrying to Philadelphia, then, it received 0.805 cent per ton per mile, against 0.77 cent for carrying to New York; now it receives 0.195 cent to Philadelphia and 0.22 cent to New York—that is, if it makes the usual differences. It has been the policy of the Pennsylvania and the Baltimore & Ohio during the present contest, we believe, to get all they could on any traffic offered, with little reference to the effect on the traffic of any place or of the roads themselves.

THE INADEQUATE SUPPLY OF LOCOMOTIVES.

One of the most remarkable facts connected with the present railroad "boom" is that the number of locomotives which the shops of the country, when worked to their utmost capacity, have been able to produce, has been very much less than the railroads have required. The supply is so much smaller than the demand that some companies, for the want of motive power, are now subjected to very serious difficulty in handling their traffic. Quite naturally, under these circumstances, some managers have been inquiring whether the deficiency could not be supplied by the shops of Europe. Last week we published a statement, copied from *The Engineer*, that an order had actually been given for "American locomotives for railways in America." The name of the road is not given, so that it is now impossible to know whether the engines are for a road in the United States or for Mexico, Canada or South America. It was reported recently that the Grand Trunk line had given an order to an English firm for freight engines, but the same company has recently contracted with the Rhode Island Locomotive Works for a number of heavy passenger engines. Thus far we have not been able to learn definitely that any railroad company in the United States has contracted for locomotives to be built in Europe; but as some railroad managers have been looking in that direction for a supply of motive power, they will probably be interested in what was learned from English and Scotch builders last summer from special inquiries made of them in relation to this subject.

It may be said, in the first place, that they all regard the present demand from this country as merely temporary, as it undoubtedly is, and therefore they are not disposed to undertake any orders unless they are desirable of themselves, without reference to future business. Any one, therefore, who goes to them with a proposition to build locomotives to American designs, drawings and specifications, will find that they are not inclined to entertain the proposition, unless the order is for a considerable number of engines and the prices very liberal. They reason in this way: The cost of new drawings, patterns, tools and new methods of doing work will be very great, and, as we are not likely to get other or many orders from America, we must make our profit out of the first work we do, as it probably will be the last.

There is another difficulty in having engines built in Europe to American designs and drawings. If a builder must follow such instructions, he of course will not feel disposed to assume any responsibility for the results of what he does not control. The consequence is, that if drawings are furnished, the only safe way is to have them made with the greatest care and with the utmost detail, showing every part in an unmistakable way. This requires a great deal of time and involves very considerable expense; and unless intrusted to very competent persons is quite certain to result in mistakes and confusion, which will be very annoying, and may be costly. Even if made in the most complete possible way, it would not be safe to intrust the work to a firm which had never built similar engines before without sending a competent person to superintend it. It is not always easy for a railroad company to find such a person. It may therefore be recognized as a fact that it will be very difficult to have locomotives built in Europe to American designs and drawings, and doing so will be attended with very considerable risk, unless the work can be intrusted to the supervision of a very competent person.

Probably some railroad managers who are very much in need of locomotives, and who can't get them here in any reasonable time, may feel inclined to ask what they can do under this condition of things. In reply to this it may be said that there is an undue prejudice in this country against European locomotives, and many American railroad men entertain the opinion not only that our way of building such engines is better than European ways, and that therefore our engines will do more work than those produced in the "effete monarchies of Europe," which may be true, but some seem to have the impression that English locomotives would "not do at all" on our roads, which it is hardly necessary to say is a delusion. There is no road in this country whose track is in a safe condition on which the typical English "goods" engine, with six coupled wheels, would not be a most serviceable machine. We would not recommend a passenger engine with a rigid wheel-base for our roads; nevertheless, engines of that class would do very good service on any road here having a track in reasonably good condition, as they do on the other side of the Atlantic. It might be added that there are a great many engines now built and running in Europe which have some form of truck, or "bogie," as they call it there, and which would be as well suited to our roads as they are to theirs.

It would be much less difficult to get locomotives made in European shops constructed according to the methods and with the details commonly used there than it would be to have them made to American designs, and while they might not be quite so well suited to the conditions here as our own engines are, they would nevertheless be very efficient machines.

If an American railroad company finds it necessary to get locomotives in Europe, the most satisfactory plan will probably be to go to builders of undoubted reputation for doing good work, and furnish them with some general specifications, and let them work them out in their own way and assume the responsibility for their own designs.

In making such specifications, though, there are some things which should be known and kept in mind. It is an undoubted fact, which the most careful inquiry has established very conclusively, that English steel will not stand when used for fire-boxes. The same thing is true of the material furnished by some of the most prominent continental makers. This being so, there are but two courses to pursue if locomotives are made in Europe: either the steel for the fire-boxes must be bought in this country and shipped to Europe to be worked into the boilers there, or the engines must have copper fire-boxes. The former plan is open to the objection that locomotives must be imported into this country either as manufactures of iron, on which the duty is 35 per cent., or as manufactures of iron and steel, on which the duty is 45 per cent. If then steel is used in the fire-boxes, the duty would be 45 per cent., but if no steel is used in the construction of the engines, excepting for such parts as the springs, etc., which are "separable" from the rest of the machine, they can be imported at 45 and the engine at 35 per cent. duty. The better plan would therefore seem to be to get copper fire-boxes and iron tubes; but as there is some difficulty in setting iron tubes in a copper tube plate, the latter might be made of Low-Moor iron. The lower portion forming the front of the fire-box could be made of copper.

The question whether European usage should be followed, and the wheels be made of wrought-iron, or whether they should be furnished here and made of cast-iron, probably will depend very much upon the prejudices of those who get the engines. The singular anomaly now exists, that English locomotive superintendents object to cast-iron wheels on account of their liability to break, and American master mechanics are afraid to use wrought-iron wheels for the same reason. Probably the risk in both cases has been exaggerated.

Many of the attempts at building trucks or "bogies on the other side of the water a competent American engineer would be compelled to say have not been very happy. Here our long experience in using them, on bad roads, has eliminated most of their defects and weak points. In Europe nearly every engineer attacks the problem with little or no experience to guide him, and, as our engineers "go at" the signal question, with a pitiable disregard for the processes of evolution which have developed principles, systems and types adapted to their environment, as Herbert Spencer would say. It would for these reasons then be advisable to furnish a design for the truck to be used, and, probably, for the rocker-shafts and steam-chests, in designing which some of the English builders have exercised a superfluous amount of ingenuity.

Some parts of a locomotive, too, such as the tender, cab, cow-catcher and smoke-stack, are so bulky, and have so little work on them, that it probably would be cheaper not to import them, but have them made here. The amount of work on them is very little, and few machine tools are needed to do it, so that in almost every shop these could be supplied.

Supposing then that a company here should want, we will say, mogul and passenger locomotives, and should, as some companies have, find it impossible to get them in any reasonable time from our shops. A letter, somewhat like the following, addressed to European builders, would soon develop the fact whether their prices and time of delivery would be satisfactory, and if the order was given on those conditions to any first-class firm the buyer would be certain to get very efficient engines—different from ours, it is

true—but engines which would do a great deal of good work. The following might be the general character of the inquiry :

"At what price and how soon could you deliver, securely packed, on shipboard,— Mogul locomotives, without tenders, cabs, cow-catchers, chimneys or any engine tools excepting wrenches?

"The design of the locomotives to be similar to that of the Mogul engines on the Great Eastern Railway, which were illustrated and described in *Engineering* of Jan. 23, 1880, excepting in the following particulars: The engines are to be of smaller dimensions and lighter, the cylinders to be —×— in., the outside diameter of driving-wheel centres, and inside diameter of tires to be — in., the wheel-base to be shortened about 1 foot. The boiler shells to be iron, the fire-box inside to be — ft. — in. long, and the tubes 2 in. diameter. The fire-box to be of copper, the tube-plate of Low-Moor iron, and to be set forward of fire-box several inches, as will be shown in a drawing. The lower part of the tube-plate on the front of the fire-box to be of copper. The driving-wheels to be [wrought iron or cast iron]. A drawing of a leading bogie or truck, of the arrangement of parts inside the smoke-box, the running boards and splashers, the attachments for cab, cow-catcher and the front draw-gear, rocker-shafts and grates will be furnished as a guide in designing the engines.

"The valve seats and chests to be on top of the cylinders, and the valves and ports to be rectangular, instead of circular as on the Great Eastern engines. The boiler to be fed by two injectors, and no pumps. The injector to be attached to the back end of the boiler with the feed-pipes inside and carried forward to near the front end, after the method employed by Mr. Webb on the London & Northwestern Railway.

"The furnace door deflector to be made of cast steel.

"No steel must be used in the construction of the engines which is not separable from them, and all steel parts must be packed and invoiced separately.

"The builders will be held responsible for the design and construction of the engines, and if they disapprove of any of the methods of construction indicated by the drawings they must so state in writing before it is too late to change them.

"This company would also like bids for — locomotive of the ordinary 'American' type, with outside cylinders and four coupled driving-wheels, and a four-wheeled truck or bogie. The cylinders to be — in. × — in., and to be placed horizontal. The driving-wheel centres or inside of tires to be — ft. — in. diameter, and the wheel-base, measured from the centre of the trailing wheels to the centre of the truck midway between its two axles, to be about — ft. — in. Otherwise the engines to conform to the preceding specification as far as that is consistent with the difference in their design."

Such an inquiry, if proper assurances were given of the responsibility of the parties making it, would soon develop the fact whether locomotives can now be obtained abroad at prices and sufficiently early to meet the unusual demand here. At the same time, it is quite certain that railroad companies will find it in every way much more satisfactory to get their locomotives here than it will be to get them abroad, and probably the time is not far distant when the supply furnished by our own makers will overtake the demand.

NEW YORK GRAIN RECEIPTS AND EXPORTS.

Mr. E. H. Walker, the Statistician of the New York Produce Exchange, favors the public unusually early with a statement of the receipts of grain of all kinds during the past year, and of the percentage brought by each route, and also of the New York exports.

The statement of receipts which we gave in our comparison of four Eastern ports last year did not include flour or corn meal, which make the equivalent of 27,608,874 bushels in Mr. Walker's complete statement, nor did it include 3,272,829 bushels of peas, beans, malt and buckwheat which he gives with the other grains, and which are not reported from week to week.

These other grains were included in the figures for previous years with which we compared last week, and to make the comparisons correct we should read 113,311,197 for the 111,415,629 bushels of grain, which we gave then as the receipts of 1881. This reduces the decrease from 1880 to 1881 to 30,494,843 bushels and 21.2 per cent. (instead of 22.5 per cent.), but the general result of the comparisons then made is unchanged.

The chief interest of this report consists in its statement of the percentage of the total grain and flour delivered at New York by each route last year. The conflict among the railroads was precipitated on account of what was considered an undue diversion of this traffic, and it is the first time that there has been an open contest over this point, the war of 1876 concerning the distribution of grain among the several markets, and not among the several carriers.

We have noted before the large diversions of grain from the New York Central, chiefly to the Erie, that occurred in March, April, and especially in May, the New York Central in the five months ending with May having carried 38.8 per cent. of the rail grain, against 51 per cent. in 1880, while the Erie carried 37.7 per cent. in 1881, against 30.4 in 1880—only 434,000 bushels less than the Central in 1881, while it was 7,374,000 bushels behind in 1880. We have shown heretofore that in June and afterwards during the railroad war the New York Central secured a larger percentage of the traffic than in these five months, but when we last reviewed the reports, last October, there had been but one month, September, when its percentages was not considerably smaller than last year. But since September it has had an extraordinarily large proportion of the grain, and has gained it at the expense, not of the Erie, but of the Pennsylvania, which until October had had a larger proportion of the New York grain than for many years before. Indeed, in the last quarter of the year the Pennsylvania may be said to have almost abandoned the New York grain traffic. Of the 16,770,000 bushels credited to it in the year 1881, it carried but 854,922 bushels in the last quarter of the year; and while it contributed 20 per cent. of the New York grain receipts in the first nine months of the year, its share was but 6 per cent. in the last three months. Meanwhile the Erie's proportion, which had been 36.4 per cent. in the first nine months was nearly as great (35 per cent.) in the last three.

To see the variation of the traffic under the influence of the railroad war, we compare below the percentage of each road in the first five months of the year with its percentage in the last seven months :

	N. Y. Cen.	Erie.	Penna.	Other.
Jan. to May	38.8	37.7	21.8	1.7
June to Dec	49.6	35.1	15 1	0.2

This gives the Central in the last seven months a much larger percentage than in the first five, but still a smaller one than in any previous entire year since 1875. The change since October is so great that it is worth noting by itself, and we give below the percentages of the several roads for the nine months ending with September and for three months since :

	N. Y. Cen.	Erie.	Penna.	Other.
Jan. to Sept	42.7	36.4	20.0	0.9
Oct. to Dec	59.0	35.0	6.0	....

This has been a quarter of light rail receipts, however, the average per month being 4,648,713 bushels, against an average of 8,865,915 in the previous nine months.

The one striking and evident thing effected by the railroad war was a great reduction in the canal receipts. The percentages of the whole receipts brought by each railroad and by water have been for the past twelve years :

Grain receipts at New York—Percentage by each route.

	N. Y. Cen.	Erie.	Penna.	Other roads.	Total rail.	Coast-wise.	Canal.	Total water.
1870	15.3	19.5	10.2	1.1	46.1	4.4	49.5	53.9
1871	9.0	19.5	8.4	1.6	38.5	2.9	58.6	61.5
1872	10.9	20.5	10.0	0.4	41.8	2.7	55.5	58.2
1873	15.5	24.2	10.8	0.5	51.0	1 4	47.6	49.0
1874	21.2	20.6	11.4	0.5	53.7	2.3	44.0	46.3
1875	24.3	23.5	8.3	0.5	57.6	2.1	40 3	42.4
1876	30.8	21.0	9.3	0.4	61.5	4.1	34.4	38.5
1877	26.8	15.3	6.3	0.9	49.3	3.9	46.8	50.7
1878	31.2	14.4	9.7	0.5	55.8	....	.....	44.2
1879	32.3	18.8	10.8	0.6	62.5	....	.....	37.5
1880	29.6	17.7	8.7	0.4	56.4	....	.....	43.6
1881	30.0	24.0	11.9	0.6	66.5	....	.....	33.5

The proportion of receipts by water was never before so small, we see. In quantity it was about 47,200,000 bushels in 1881, against 74,700,000 in 1880. The railroads succeeded perfectly in spoiling the canal business, but their low rates did not serve to increase total shipments, which decreased 30,000,000 bushels.

The struggle, however, not being between the railroads and the canal, but between the different railroads, we are most interested in examining the course of the rail grain receipts. We can see from the above which road has gained and which has lost in comparison with its rank in the previous year, but as 10 per cent. of the whole when the water receipts are one-third of the whole is as large a portion of the rail grain as 20 per cent. when the water receipts are but one-third of the whole, we will do well to consider the rail receipts by themselves.

Rail Grain Receipts at New York—Percentage by each Railroad.

	N. Y. Cen.	Erie.	Penna.	Other roads.	Total.
1870	33.2	42.3	22.1	2.4	100.0
1871	23.4	50.6	21.8	4.2	100.0
1872	20.1	49.0	29.9	1.0	100.0
1873	30.4	47.4	21.2	1.0	100.0
1874	39.5	38.4	21.2	0.9	100.0
1875	42.2	40.8	16.1	0.9	100 0
1876	50.1	34.1	15.1	0 7	100.0
1877	54.4	31.0	12.8	1.8	100.0
1878	55.9	25.8	17.3	1.0	100.0
1879	51.7	30.0	17.3	1.0	100.0
1880	52 4	31.3	15.5	0.8	100.0
1881	45.1	36.2	17.9	0.8	100.0

Compared with 1880 we find that the Erie and the Pennsylvania brought a larger proportion of the New York rail grain receipts in 1881, and the New York Central a considerably smaller one. Further, the New York Central's proportion is the smallest and the Erie's the largest since 1875; the Pennsylvania's the largest since 1874. Until 1874 the Erie was the chief carrier of grain to New York, but that was largely because the other roads did not want it, probably. It was then considered undesirable freight, and the other roads had better command of the more profitable freights. But the total rail receipts at New York were comparatively small in those days, rising from 32,000,000 bushels in 1870 to 48,000,000 in 1873, but growing to 58,000,000 in 1874, when the New York Central first began to carry largely and the Pennsylvania also. There was no considerable change in this until 1878, when the rail receipts swelled to 77,170,000 bushels, to 103,558,000 in 1879, 96,885,000 in 1880, and 93,735,000 in 1881. While the total grain and flour receipts of New York were 30,652,000 bushels (18 per cent.) less in 1881 than in 1880, the rail receipts were but 3,150,000 (3¼ per cent.) less, the receipts by water having fallen off 27,500,000 bushels, or 37 per cent. The receipts by water are not exclusively by canal. In 1877, for instance, more than four million bushels arrived by vessels from other points on the coast. The decrease in canal receipts has been heretofore reported as 34,000,000 bushels, but this must have been an error.

The receipts and exports at New York and the excess of its receipts over its exports for six years have been :

	Receipts.	Exports.	Excess of receipts.
1876	95,101,818	54,716,039	40,385,779
1877	102,223,498	62,890,529	39,342,969
1878	154,441,890	109,445,579	44,996,311
1879	165,798,682	126,459,289	39,339,373
1880	171,571,091	135,937,08 :	35,634 005
1881	140,919,071	96,532,200	44,386,871

The excess of receipts over exports indicates the quantity consumed at New York or reshipped for domestic consumption. The fluctuations may be partly accounted for by differences in the stocks on hand at the close of the year, and, in fact, about 4,000,000 bushels more were on hand at the end than at the beginning of 1881. But the fluctuations in these receipts for domestic consumption have been comparatively slight for many years. In the six years from 1870 to 1875, inclusive, they varied only between 38 and 45 millions, and for twelve years past the aggregate excess of receipts over exports has been 501,000,000 bushels, which is at the average rate of 41,750,000 bushels a year; in the last six years it was 40,700,000 per year.

We may assume, therefore, that New York requires 40,000,000 bushels of grain a year for home consumption, and this is a traffic which cannot be diverted from it, nor on which the competition of markets compels the acceptance of low rates of transportation. Rates such as were had in 1880 would yield more than $13,000,000 on this part of the grain, if it were brought on the average from points as far west as Chicago. The competition of the Erie canal, however, affects nearly the whole of it.

Chicago and Milwaukee Receipts for Four Years.

The reports of receipts of grain, flour and hogs, as made from day (and subject to correction) foot up as follows for the last four years :

Chicago :	1878.	1879.	1880.	1881.
Wheat, bu	29,713,577	34,106,109	23,541,607	15,335,540
Corn, bu	63,851,518	64,339,321	67,212,844	78,227,364
Oats, bu	18,839,297	16,660,428	23,-90,915	25,130,479
Rye, bu	2,490,615	2,497,340	1,899,218	1,626,810
Barley, bu	5,754,059	4,936,562	5,211,536	6,024,875
Total bu	120,449,066	122,539,760	151,386,120	126,345,068
Flour, bbls	3,030,562	3,369,058	3,215,389	5,211,126
Hogs, head	6,44 ,166	6,539,344	7,148,457	6,512,585
Milwaukee :				
Wheat, bu	21,763,312	19,649,352	11,756,463	9,873,591
Corn, bu	934,356	1,369,624	2,161,507	963,665
Oats, bu	2,037,437	1,705,062	2,031,878	2,218,341
Rye, bu	792,728	856,124	869,211	666,231
Barley, bu	3,409,710	3,895,759	3,878,272	3,957,611
Total bu	28,937,543	27,475,921	20,697,331	17,679,439
Flour, bbls	2,288,303	2 ,399,673	2,394,176	3,348,616
Hogs, head	691,319	620,527	627,513	640,236

Here, in grain of all kinds, the receipts at Chicago in 1881 were about 25,000,000 bushels (16½ per cent.) less than in 1880, but 3,800,000 more than in 1879 and 5,900,000 more than in 1878. The decrease has been chiefly in the last three months; at the end of September the receipts were but 8,100,000 less than in 1880. There is an increase of no less than 1,995,737 barrels (62 per cent.) in flour, which was wholly in the first ten months of the year; the receipts for two months past being much less than last year. This increase in flour is equivalent to nearly 9,000,000 bushels of wheat, and the receipts of flour and wheat together were a little larger than in 1880. There is a decrease of 635,872, or 9 per cent., in the receipts of hogs, which were about the same in 1881 as in 1879 and 1878.

At Milwaukee the total grain receipts in 1881 were 3,018,000 bushels (14¼ per cent.) less than in 1880, 9,800,000 bushels (36 per cent.) less than in 1879, and 11,258,000 (40 per cent.) less than in 1878—a constant and rapid decrease

from year to year. There was, however, in 1881 an increase of 954,440 barrels (40 per cent.) in flour receipts, and this is equivalent to 4,295,440 bushels of wheat, or considerably more than the decrease in grain.

The extension of the lines of the Chicago, Milwaukee & St. Paul Railway, which is the chief carrier of grain to Milwaukee, might have been expected to increase Milwaukee receipts largely; but it seems not to have had that effect. The truth is, grain production west of Lake Michigan and north of the north line of Illinois, whence Milwaukee's receipts have been chiefly derived, has not increased as largely as further south. The Milwaukee & St. Paul has been increasing its lines south of this line greatly of late, but it has also greatly improved its connections from these lines to Chicago, which is their market rather than Milwaukee. The effect on Milwaukee trade of better connections to the Southwest should be seen, if at all, in an increase of the corn receipts, since that is the great crop as far south as the Illinois line and its extension across Iowa. But the Milwaukee corn receipts continue insignificant, and do not grow much. The largest were 2,140,000 bushels as long ago as 1872, and 2,161,500 in 1880, falling last year to 964,000, and in comparison with the 97,000,000 bushels received at Chicago in 1880 or even the 78,000,000 received there in 1881, these receipts are hardly worth noting. Apparently, no extension of railroad connections with the corn-growing districts tends to make Milwaukee a corn market. It receives a great deal more barley than corn, and the barley is received for home consumption at the Milwaukee breweries.

Comparing the two places, Chicago received seven times as much grain as Milwaukee, 57 per cent. more flour and ten times as many hogs. It is long since the two cities could be looked upon as anything like equal competitors for the traffic of the West: but not long since Milwaukee was often equal to Chicago in wheat receipts, and sometimes surpassed it. Taking the aggregate wheat receipts of both places, Milwaukee had 39½ per cent. of the total in 1881, against 33¼ per cent. in 1880, 37 per cent. in 1879 and 42 per cent. in 1878. But in 1877 Milwaukee had 58 per cent. of the total wheat, in 1876 52 per cent. and in 1875 53½ per cent. The great increase in grain production and shipments in this country began in 1877, yet taking flour and wheat together, the receipts at Milwaukee were larger in 1875 than in any year since, and smaller in 1881 than in any year since 1872, except 1880.

At both places the most notable change in 1881 was the great increase in flour receipts, coupled with a great decrease in wheat receipts. Taking the two places together, the receipts of wheat, of flour reduced to bushels, and the proportion of the flour receipts to the total have been, for eleven years past:

Year.	Wheat.	Flour.	Wheat and flour.	P. c. of flour.
1871	30,126,267	11,044,295	41,170,562	29.3
1872	26,343,600	11,831,080	38,174,680	31.0
1873	54,724,499	18,710,985	73,435,484	25.5
1874	55,392,765	21,415,348	76,808,113	27.9
1875	52,085,097	20,348,420	72,433,517	28.1
1876	34,748,875	25,189,425	59,938,300	42.0
1877	33,468,224	22,952,810	56,421,034	40.7
1878	51,115,530	26,469,325	77,584,855	34 1
1879	53,286,292	25,963,286	79,249,578	32.8
1880	35,298,070	25,243,042	60,541,112	41.7
1881	25,209,031	38,618,839	63,827,870	60 5

If we follow down the columns for flour and for the total of wheat and flour, representing the quantity of wheat marketed at these two Lake Michigan ports, we find in the latter the fluctuations attending the variable crops and the growth of the wheat-growing industry west and southwest of Lake Michigan—a great increase from 1872 to 1873, maintained for three years, then for two years receipts reduced by bad crops (only one bad crop, as this reduces the receipts of the last half of the year in which the crop is raised and in the first half of the next year); then a great gain for two years, followed by a considerable reduction in the last two years. But the flour receipts take no such course. They have progressed by leaps, and have been comparatively stationary at other times. Thus we have an increase of 58 per cent. from 1872 to 1873—probably mostly in the last half of the year, after the great wheat harvest of that year. From that time, there was comparatively little change until 1881, so much so that the gain in the six years from 1873 to 1880 was less than that from 1872 to 1873. But last year we have another enormous increase in flour, amounting to 13,600,000 bushels and 54 per cent.—very much like that from 1872 to 1873.

It is not strange that flour receipts should not decrease much when crops fall off. Only a part of the wheat is ground at home at best, and when the mills have once been built we should expect them to be kept busy, whatever the crops, so long as there is any profit in grinding. We see that this has been the case substantially. When the crops fell off, as denoted by the reduced total receipts of 1876 and 1877, flour receipts were larger even than in the three previous years, when the aggregate wheat and flour receipts were 12 to 20 millions larger, and there was but little increase in flour from 1876, when wheat and wheat product marketed were 60,000,000, to 1878 and 1879, and when there were 77,000,000 and 79,000,000 marketed. At last, last year, with the total 15,400,000 less than in 1879, the flour receipts are 12,700,000 more.

It seems that the growth of the milling industry of the Northwest is by taking a great steps at long intervals. The business becomes profitable, remains so for a year or two, and then all at once a large number of new mills is built. Then the business becomes unprofitable, or not profitable enough to induce more investments in mills, and the production is stationary for several years, when again at once the flouring capacity is vastly enlarged.

There are already signs that, for the present conditions, there are too many mills. Though there is an increase of 54 per cent. in the flour receipts of Chicago from 1880 to 1881, in the last two months a very large number of the Northwestern mills were closed or not worked to their full capacity, and the receipts were very much smaller than last year. The millers charge this to the speculation in wheat, which makes prices comparatively higher here than abroad. At these prices, the millers cannot sell flour abroad, and there is (comparatively) no speculation in flour. There are men who buy grain by the millions of bushels for future delivery, confident of higher prices, and these make the market for wheat, now that we export very little; but they do not so buy flour, and when the miller sells it is for consumption at an early day. He can get the prices required by the American price of wheat for what is consumed here, but not for exports, and he is compelled just now to limit production chiefly to the home demand.

It is desirable to note that the great increase in flour last year makes the comparison of grain receipts, and especially of wheat receipts, with those of previous years very deceptive. For instance in the above table we see that the wheat receipts of Chicago and Milwaukee were 10,000,000 bushels less last year than in 1880; yet the wheat and flour receipts were equivalent to 63,800,000 bushels in 1881, against 60,500,000 in 1880.

Chicago Shipments Eastward.

The shipments of freight over the roads from Chicago to the East to points east of Toronto, Suspension Bridge, Buffalo, Salamanca, Pittsburgh, Wheeling and Parkersburg—that is, the shipments divided under the pool in 1880—have now been reported for December and for three successive years.

Contrary to the common newspaper reports, the shipments are not light now: on the contrary they are very large, though, of course, at current rates, entirely unprofitable. For the month of December they have been, for three years, in tons:

1879.	1880.	1881.
179,154	244,790	259,326

The December shipments were thus 6 per cent. more in 1881 than in 1880, and 45 per cent. more than in 1879. Last December they were also nearly 20 per cent. more than in November and considerably above the average for the year,—exceeded slightly in January, August and September and considerably in April. In the last week of the year the shipments were 59,522 tons, against 44,081 in 1880 and 35,148 in 1879. In that week 5.4 per cent. of the total shipments were by the Chicago & Grand Trunk, 29.7 by the Michigan Central, 27.2 by the Lake Shore, 18.3 by the Fort Wayne, 15.8 by the Panhandle, and 3.6 by the Baltimore & Ohio. The two Vanderbilt roads had 56.9 per cent., instead of their 49 under the pool; the two Pennsylvania Roads 34.1, while their pool percentage is 33.

For the three calendar years the shipments have been:

	1879.	1880.	1881.
Tons	2,471,738	2,309,640	2,889,317

Last year the shipments were 579,677 tons, or 25.1 per cent., more than in 1880, and 417,579 tons, or 16.9 per cent. more than in 1879.

The percentages of shipments by each road during the whole year 1881 and during the 6½ months beginning June 14, which includes the whole railroad war, and the percentages by the apportionment of 1881 were:

	Grand Trunk.	Mich. Cen.	Lake Shore.	Ft. Wayne.	Pan-Handle.	B. & O.
Year	10.0	26.1	25.3	21.0	11.7	5.9
June 15 to Dec 31	9.9	26.8	26.3	20.2	11.5	5.3
Pool per cents	10.0	26.0	23.0	23.0	10.0	8.0

For the year the Chicago & Grand Trunk has exactly its allotted percentage, and the Michigan Central almost exactly. The Lake Shore has 2.3 per cent. more, and the Fort Wayne 2 per cent. less, while the other Pennsylvania road has 1.7 per cent. more. On the whole it may be said the result is a transfer from the Baltimore & Ohio to the Vanderbilt roads.

The changes during the railroad war were singularly small, the percentages for the last 6½ months being very like those for the whole year. What changes there were were in favor of the Vanderbilt roads.

For the week ending Jan. 7 the Chicago Board of Trade reports the shipments billed from Chicago to have been 45,036 tons, which is 2,704 tons less than it reported for the previous week (when it reported 11,742 tons less than the total shipments). Of last week's receipts, 9,052 tons were flour, 23,429 grain and 12,560 provisions. Again, the reports show that the Pennsylvania has about given up the grain and flour trade in favor of provisions. The two Vanderbilt roads carried about 72 per cent. of the flour and 64½ pre cent. of the grain, but only 31.6 per cent. of the provisions, while the Fort Wayne took 40 per cent. of the provisions but less than 5 per cent. of the flour and 8 per cent. of the grain, being entitled under the pool to 23 per cent. of the whole. It is true that the other Pennsylvania road, the Panhandle, carried 17½ per cent. of the flour and 12 per cent. of the grain, being entitled to but 16 per cent. under the pool, but the shipments by the Pan-handle are chiefly Erie shipments, a comparatively small part of them being carried by the Pennsylvania east of the Pan-handle proper; moreover, the provision shipments by this line were 23.4 per cent. of the whole. It is not, however, exceptional for the Pennsylvania lines to carry most of the provisions. In the year 1880 the Fort Wayne had 29.6 per cent. and the Pan-handle 26 per cent. of the total shipped East by the six roads, while of the shipments of all freight the two had but about 33 per cent. In the same year the Lake Shore carried 18.2 per cent. and the Michigan Central 15.7 per cent. of the shipments of provisions east from Chicago, though together they carried as much as 50 per cent. of the total Chicago shipments eastward.

This seems somewhat remarkable when it is remembered that comparatively a small part of the provisions go to Philadelphia and Baltimore, and a vastly larger proportion to New York and Boston. Of the exports in 1880, New York and Boston had 560,000 tons, against 49,300 at Philadelphia and 32,300 at Baltimore, the total Philadelphia and Baltimore exports being about one-seventh of those at the other two places. A large proportion of the provision shipments are for domestic consumption, it is true, but the roads carrying to New England and interior New York should have the larger part of this it would seem. The Pennsylvania, however, doubtless carries much more destined for Southern consumption than the more northern roads, and this is, in the aggregate, a large amount.

With regard to the current Chicago shipments, they cannot be called small by any means, though perhaps a little smaller than at this time (since December) last year, when the Board of Trade reported them to be 49,367 tons in the first week of January. But shipments were exceptionally heavy then. For the whole year, the average weekly shipments (including those billed from points west of Chicago) were 47,531 tons in 1879, and 44,416 in 1880, and about 55,564 in 1881. Last year in January the shipments were considerably above the average for the year; in 1880, the January shipments were very far, and in 1879 considerably, below the average of the year. In 1879 the January shipments were 7.8 per cent., in 1880 7.08 per cent., and in 1881 9 2 per cent. of the year's shipments. It is doubtless true that the shipments now are much larger than they would be at last year's rates. There is no inducement whatever to hold for the opening of navigation, as water rates are sure not to be lower than rail rates are now. Yet grain is held: the current daily reports show receipts at Chicago and Milwaukee to be nearly twice as great as the shipments, and as most of the grain going forward now is not for export, but for domestic consumption, we may doubt whether the shipments are so much affected as is commonly supposed by the rates, or as much as they would be when exports are large.

Foreign Railroad Notes.

At the end of 1880 there were 5,418 miles of railroad in Italy, 230 having been completed during the year. These were equipped with 1,443 locomotives, 4,580 passenger cars and 24,284 freight cars. The New York Central, with less than one-fifth of the mileage, has a little less than one half the number of locomotives and one tenth the passenger cars, but seven-eighths the number of freight cars. The mileage is about equal to that of the state of New York, whose area is 46,000 miles, against Italy's 112,000, and its population 5,000,000 against Italy's 27,000,000. The Italian roads have cost $97,975 per mile, including equipment, and in 1880, they earned $6,559 per mile, which is not far from the average on American roads, and $1.57 per train-mile; while the expenses were $4,453 per mile of road and $1.07 per train-mile, which is 68 per cent. of the earnings. The traffic of the whole system was 946,662,360 passenger-miles and 701,297,848 ton-miles. The passenger traffic was about equal to that of the New York Central, the Erie and the Pennsylvania together, but the freight traffic was little more than a quarter of that of the New York Central alone, and but one-third the Erie's. It was equivalent to 240 passengers and 177 tons of freight each way daily over the whole railroad mileage of the kingdom. This would be a very good passenger traffic, but a very light freight traffic, in this country. Of the earnings, 41.4 per cent. were from passengers, the average rate per mile being less for a passenger than for a ton of freight, as is not uncommon in Europe. The rates were 1.52 cent per passenger per mile and 2.02 cents per ton per mile, the latter being considerably more than twice the average rate in New York by the report for the year ending with September, 1880, but the former about 40 per cent. less.

The number of persons employed on the Italian roads was 63,511, or at the rate of 11.72 per mile of road—probably twice the average in this country. The work done per employé amounted to 14,905 passenger-miles and 11,042 ton-miles. On the New York Central last year the work per employé was 25,421 passenger miles and 80,019 ton-miles—about 60 per cent. more passenger service and more than seven times as much freight service per man. The Italian employés received as average yearly wages $205.20; those of the New York Central, $526.84. These wages made up 55¼ per cent. of the total working expenses of the Italian roads, and 39¾ per cent. of the New York Central's. In proportion to the amount of work done, the cost of labor is much less on the New York Central, though the men get two and a half times as much for a day's work.

There were 490 derailments and 347 collisions on the Italian railroads in 1880, and 32 persons were killed and 453 injured by accidents in operation. No passengers were killed, however, and but 16 injured by such accidents; but the victims of these, as elsewhere, were but a small part of those killed on the railroads, most being persons on the track. In all, 179 persons were killed and 688 injured on the Italian railroads in 1880.

An Austrian engineer writes to the Austrian *Railroad Journal* of the "fireless locomotive," which is our old New Orleans friend invented by Dr. Lamm, improved by a French engineer, Francque. A few years ago the French journals made frequent mention of this engine, as of two

or three other street car motors, but it has been long since they have discussed it. It appears, however, that a Paris suburban line is fully equipped with them, and has been worked with them for four years. The road is six miles long, from Rueil to Marly-le-Roi, and at one end there is a very steep grade for nearly a mile and a quarter. The locomotives weigh 18,000 lbs. in service, and are said to be of 16 horse-power. As far as the foot of the steep grade they take four cars of passengers at a speed of 9 to 12½ miles per hour, the whole weighing 31,000 lbs., and they run 9 miles with a single charge of the boiler. Up the steep grade, at the foot of which the engines are charged, the engine usually pushes one, but sometimes two cars. The road is a railroad, and not a tramway. There are 31 boiler charges made daily, and the fuel required is reported to be 35,000 lbs. of "briquettes" for this service. Five of the fireless locomotives are employed, and the two ordinary locomotives used originally are now kept as reserve engines. The entire expense of the six miles of road (which has but few, and these very simple, stations, and is laid in the public street), is about $28,000 a year; its earnings, $72,000. It serves exclusively for passenger traffic, and the fares on it are low.

The Dutch government some time ago notified the railroad companies to make preparations for the introduction of automatic brakes, and a few weeks ago they were warned to submit their plans to the Minister of Canals, Commerce and Industry. The brake must answer the following requirements: 1. Bring the train to a stop quickly. 2. It must be capable of being applied instantaneously by either the engineer or the conductor. 3. In case of the parting of the train or a part of it becoming disabled, the brake must act immediately. After the time is passed for the submission of the proposals of the companies, our authority says that "it will be for the Minister to decide in how far preference is to be given to the Westinghouse brake as against any other system."

A few months ago the Prussian government bargained for one of the principal private railroads, the Berlin & Anhalt, and offered to pay 5¼ per cent. on the stock for it. The proposition being submitted to the stockholders, they refused to accept it. It was then said that the government would not make any better terms; but recently it has made a new offer of 6 per cent. This is equivalent to an advance of 14 per cent. in the value of the stock, and the proprietors doubtless feel paid for waiting a few months.

The Dutch state railroad system at the close of the last fiscal year, June 30, had 598 miles of railroad, which had cost on an average $117,950 per mile.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Augusta & Knoxville.—Extended from Parks, S. C., north by west to Dorn's Mine, 15 miles.

Bodie Lumber Co.—This company's road is extended 1½ miles in Bodie, Cal. Gauge, 3 ft.

Burlington, Cedar Rapids & Northern.—The old *Chicago, Clinton & Western* line is extended westward to Noe's, Ia., 6½ miles.

Chicago, Texas & Mexican.—Extended southward to near Cleburne, Tex., 33 miles.

Cincinnati, Georgetown & Portsmouth.—Extended eastward from Bethel, O., to North Feesburg, 7 miles. Gauge, 3 ft.

Deadwood & Woodville.—Completed from Deadwood, Dak., to Woodville, 9½ miles. Gauge, 3 ft.

Flint & Pere Marquette.—The *Manistee Division* is extended from Stronach, Mich., northwest to Manistee, 3 miles.

Georgia Pacific.—Track has been laid from Atlanta, Ga. west 6 miles, and from Columbus, Miss., east 20 miles. The *Deer Creek Branch* has been extended from Arcola, Miss., south to the Sharky County line, 12 miles.

Houston & Texas Central.—This company's *Texas Central* line is extended from Cisco, Tex., northwest to Albany, 34 miles.

Indiana, Illinois & Iowa.—Completed from Momence, Ill., to Dwight, by laying 17½ miles of track between Reddick and Dwight, and from Kankakee westward.

Lehigh Valley.—A branch is completed from Pink Island Junction, Pa., to Freeland, 2 miles.

Missouri, Kansas & Texas.—Branches have been finished from Atoka, Ind. Ter., west 5 miles, and from Savanna, Ind. Ter., to coal mines, 1 mile.

Missouri Pacific.—The *Jefferson City, Lebanon & Southwestern Branch* is extended from Russellville, Mo., southwest 7 miles.

New York, Chicago & St. Louis.—Extensions of track have been made east of Cleveland, O., 25 miles; east to Bellevue, O., 17.81 miles; west of Hadley, Ind., 10 miles; east and west of Valparaiso, Ind., 16.57 miles, a total of 69.38 miles.

Northeastern, of Georgia.—Extended from Rabun Gap Junction, Ga., northward to Clarkesville, 10 miles. Gauge, 5 ft.

St. Louis & San Francisco.—This company has completed a cross-cut from Sedgwick, Kan., to Halstead, 9 miles.

St. Paul, Minneapolis & Manitoba.—The *Northwestern Branch* has been extended from Osseo, Minn., northwest 34 miles.

South Florida.—Extended from Orlando, Fla., southward to Kissimee, 18 miles. Gauge 3 ft.

Wabash, St. Louis & Pacific.—*The Champaign & South-eastern Branch* is completed from Sidney, Ill., northwest to Champaign, 12 miles.

This is a total of 332½ miles of new railroad built in 1881, making 8,566 miles reported for that year against 6,344 reported for 1880 at the corresponding time last year.

The first track reported for 1882 is as follows:

St. Paul, Minneapolis & Manitoba.—About 4 miles of track on the *Northwestern Branch* to Clearwater, Minn., was laid since Jan. 1.

No new track for the year had yet been reported at the corresponding time last year.

EAST-BOUND RATES have been openly reduced again, the Pennsylvania announcing that it would take provisions from Chicago to New York at 10 cents per 100 lbs. Its rate had been 15 cents, while it charged 20 cents for grain. The nominal rate by the other roads was but 15 cents for grain; but it is reported that they carried and still carry most of it at 12½ cents, and had also made contracts for provisions at least as low as that. The Pennsylvania people report that they take no grain at less than 20 cents. With the other lines charging 12½, this must shut them out (at Chicago and at most Western competing points) from export grain and from all shipments to New York; but they can still get a share of the shipments for local consumption at Philadelphia and Baltimore, and the whole of those to the numerous local points on the line, and perhaps make a trifle on this business, while they carry the provision business at a loss, and the other roads carry all their through business and also the shipments to interior New York and New England points at a loss. The Chicago report shows that the Pennsylvania is carrying very little flour and grain, but most of the provisions. Its policy seems to be to make the business of its rivals as unprofitable as possible, but not to carry itself any more traffic at a loss than is necessary to spoil the rest of the traffic—which is good fighting tactics, but not always easy to carry out. Both the Pennsylvania and the Baltimore & Ohio seem not to desire traffic at current rates, and to be willing to let it go to New York roads and leave Philadelphia and Baltimore for New York, rather than carry it at a loss. The exports are now so small that the diversion of traffic cannot be very great, even if Philadelphia and Baltimore lose all their grain exports; their provision exports have never been important.

The recent reductions at Chicago are not so important as if the nominal rates had been maintained. They probably make an actual difference in the freights on provisions, for though some may have been carried at 10 cents per 100 lbs. previously, probably most of the shipments were at 12½ and from that to 15 cents. The chief significance in the matter is that it shows a disposition to force the fighting.

ARBITRATION of the question of rates to New York, Philadelphia and Baltimore is said to be virtually refused by the Pennsylvania Railroad Company. It is reported that it will not agree to accept the decision of any such arbitration, but will be glad to have the question passed upon by a disinterested tribunal. But this would not be arbitration: rather an investigation for the information of the contracting parties. An investigation would be a good thing, especially if made with the help of the exporting merchants of the several cities. It would seem that each company should have made a thorough one for itself long ago, or rather, be making one all the time, but it is doubtful if any company has done so thoroughly. But if the Pennsylvania has done so and is thoroughly convinced that the abolition or reduction of the present differences in favor of Philadelphia and Baltimore would destroy or very much reduce the exports of those places, it is easy to understand why it is unwilling to submit the question to arbitration. It cannot possibly gain by the decision, and it may lose; and if the result should be very unfavorable to Philadelphia and Baltimore, the company would hardly be able to endure the feeling of hostility that would follow; and probably it would be impossible to keep any agreement having such a result. The company cannot legally bind itself to keep such an agreement, and if the officers who made it insisted upon it, they would probably have to make way for others.

Still there seems to be no way out of the trouble now except by arbitration. If Philadelphia and Baltimore have a good case, it ought to be possible to prove it before an intelligent and disinterested tribunal; and so far as the company itself is concerned, it must balance the possible evils of a change in differences (including public obloquy therefor) against the certain losses by an indefinite continuance of the railroad war. If it thinks the latter the less evil, it doubtless will not arbitrate. It must lose more in amount by the demoralization of through rates than any other one railroad company, though, perhaps, no more than the combined Vanderbilt companies; but it is probable that just now its through traffic is less important to it than to any other trunk line except the Baltimore & Ohio. But in times of business depression the reverse is true.

Later we learn that at the monthly meeting of the Baltimore & Ohio directors last Wednesday a resolution was adopted unanimously not to submit the question of differences of rates to arbitration.

THE MISSISSIPPI GRAIN SHIPMENTS continue trifling, and are very much less than the New Orleans receipts. In December the river shipments reported were only 150,960 bushels, against 518,988 in the four weeks previous. In May and June the river shipments averaged 466,000 bushels *per week;* in the month of July they were 941,000; in August 432,000; but since August—that is, in the last four months of the year—they were but 1,180,800 bushels in all, an average of but 61,100 bushels a week. In these four months the New Orleans receipts were 2,660,700 bushels—much more than double the river shipments. Thus at present the river seems unable to compete with the railroads to New Orleans, not to say the roads to the East. Really the river is not now an element in the competition, because at present New Orleans has virtually ceased to export. In the four weeks ending Dec. 31 its aggregate grain exports were 79,512 bushels, and in the four months ending with December they were but 317,881 bushels—the total exports of Atlantic ports in that time having been 22,820,000 bushels. No other explanation than the low rail rates is needed. Last year at this time the railroads were getting about 23½ cents a bushel for carrying wheat from St. Louis to New York; and two years ago their charge was 27 cents; now they take it for about 8½ cents or less. That the New Orleans route should succeed when competing with the latter rate, and fail when the competing route reduces from 23½ to 8½ cents, is in no respect surprising. But the barges are still in existence, and ready to compete with the railroads when the latter charge paying rates. Their owners suffer comparatively little by their idleness, because the capital invested in the barges is comparatively a trifle. Last spring, Vice-President King, of the Baltimore & Ohio, reported the total investment in barge lines, having 94 barges and 15 tow boats, with a capacity for carrying 4,300,000 bushels per trip, to be only $1,140,000, equivalent to about 20 miles of Western railroad.

THE PHILADELPHIA LIVE-STOCK TRADE we should expect to vary only about in proportion to the population of the city and the vicinity which gets its supplies there, and the ability of the people to buy meat, as there are no exports thence to speak of. From 1878 to 1881 there was an increase of 9 per cent. in the number of cattle, of 30 per cent. in the hogs, and a trifling decrease in the number of sheep received.

The cattle receipts last year were 205,912, against 683,558 at New York. New York exported a considerable number, however, and the balance left it for consumption was 572,810 head, or 180 per cent. more than the Philadelphia receipts. There are three considerable cities besides New York, however, that get their supplies at the New York stock yards, and their aggregate population by the last census was 2,030,000, while Philadelphia's was 847,000. New York also received 174 per cent. more sheep than Philadelphia, and more than four times as many hogs. The receipts of hogs, however, are no criterion of the consumption, as they are more frequently cured and packed than consumed fresh, and when packed may be marketed anywhere.

This enormous live-stock trade, almost exclusively a traffic for home consumption which can pay high rates for transportation, was carried probably entirely without profit the entire year. It may not be generally known that live stock is not included with other freight in any of the statistics of through business, nor have the agreements or disagreements with regard to other freight usually had any application to live stock. It was not made unprofitable by the breaking out of the railroad war in June last, because it was already carried and for a long time had been at about half the regular rates—if there can be said to be anything regular about the rates in this traffic, which is in a chronic state of demoralization. But the rates on other through freight have been so much lower than the live-stock rates for some months past that this traffic is now perhaps the most profitable part of the through traffic—if the word "profitable" can be applied to any of it.

CALIFORNIA WHEAT EXPORTS BY NEW ORLEANS are contemplated, and it is reported that orders have been received at New Orleans from San Francisco to provide freight room for 180,000 bushels in March and April next. This would make 400 car-loads, and probably as many as fourteen trains over the Southern Pacific road and its connections to New Orleans, which are at present the Texas & Pacific, the New Orleans Pacific and Morgan's Louisiana & Texas. This cannot be called a large quantity, but it will do very well to begin with. Probably rates will have to be accepted lower than on any freight heretofore carried across the continent, and if the business is continued they will vary greatly from year to year, with the vessel rates from San Francisco to Liverpool, which have been as low as 35 shillings and as high as 100 shillings a ton. At present they are about 70 shillings and are esteemed very remunerative. This is about 46 cents a bushel or 76 cents per 100 lbs. From San Francisco to New Orleans is about 2,400 miles—a tremendous haul for grain. At the rates of the roads to Chicago from such places as Kansas City and St. Paul the charge to New Orleans would not be less than 75 cents per 100 lbs. At what are considered rates fairly above cost on the trunk lines the charge would be over 50 cents per 100 lbs.; and probably at anything much higher than this the grain would prefer the vessels at current rates. We cannot count on current rates for vessels, however. It is little more than two years ago that they were 40s. or less per ton, less than 44 cents per 100 lbs., and to meet this rate the railroads would probably have to carry at 30 cents to New Orleans, or at the rate of 12 cents from Chicago to New York—just about current trunk line rates, and much below cost on the trunk lines even. The Southern Pacific, however, can carry a great deal of grain from points 100 to 200 miles south of San Francisco, and in comparing we should add the rail charge on this to the ocean charge from San Francisco.

THE PETROLEUM EXPORTS seem to increase altogether out of proportion to other business. There seems to be no limit to the foreign demand when the world takes 42 per cent.

more in 1881 than in 1880. But there are strange fluctuations in the growth of the exports:

In millions of gallons these have for seven successive years:

1875.	1876.	1877.	1878.	1879.	1880.	1881.
240	256	355	334	409	350	507

From 1875 to 1876 we have the moderate increase of 6⅜ per cent.; from 1876 to 1877 the immoderate increase of 39 per cent.; from 1877 to 1878 a *decrease* of 6 per cent.; then from 1878 to 1879 an increase of 22 per cent.; from 1879 to 1880 again a *decrease* of 14½ per cent., last year another huge increase, larger than any before, of 43½ per cent. Of course, foreign imports and consumption are not necessarily the same in any one year. At current New York prices the whole increase of exports last year would represent but $11,000,000 In talking of gallons of petroleum we have a very small unit, in value not much more than half that of a pound of cotton; yet we count cotton by bales, and do not speak of the crop of 1880 as one of 3,200,000,000 lbs. Crude oil at the wells is now one of the cheapest articles that are carried long distances, the price of pipe line certificates being about 84 cents per barrel of 42 gallons, weighing about 280 lbs. This is equivalent to 16¾ cents a bushel for corn.

Petroleum does not now interest the railroads as it once did. The great bulk of the crude oil is now taken to the refineries by pipe lines, and when carried to the sea-board by rail the rates received are so very low that no one seems eager to obtain the traffic. The distribution for domestic consumption, which is enormous, is an important and often a profitable traffic.

THE WINTER PACKING SEASON still shows a large decrease in the number of hogs packed in the Northwest. In November and December last, which are the first half of this "season," 22¼ per cent. less were packed than in 1880, and 19 per cent. less than in 1879, the decrease from 1880 being more than a million head. This is felt by both Western and Eastern roads, by the Western chiefly in reduced transportation of live hogs to the packing towns--usually a profitable traffic; by the Eastern almost entirely in lighter provision shipments. The shipments from Chicago, in fact, during these two months, were 29 per cent. less than the year before, amounting to 1,920 tons daily, against 2,700 tons in 1880.

At this season of the year provisions form a large portion of the through traffic, and usually a more profitable one than grain and flour. Now, however, the rates are lower on provisions than on grain. At current rates (but they have not been quite so low all the time) the Chicago shipments of the last two months would have yielded only $200,000 of gross earnings, while last year the shipments in the same time yielded about $1,120,000.

NEW PUBLICATIONS.

The Treatment of Steel.—Messrs. Miller, Metcalf & Parkin, of the Crescent Steel Works of Pittsburgh, have published in a little volume a series of circulars on heating, annealing, forging and tempering, these circulars containing directions for the manipulation of the steel which the firm issuing them have from time to time sent out to those who use the material made at their works. They have resulted from inquiries made of the firm concerning steel, its correct treatment and management. One of them is on "The Treatment of Steel," and others "On Annealing;" "On Heating Steel;" "Furnaces;" "Effects of Heat upon Steel;" "On Temper of Steel;" "On Gauges," and a paper with the title "Why does Steel Harden?"

The first one contains the statement, which will probably surprise many persons, that the eye can judge of the percentage of carbon in an ingot of cast steel almost or quite as accurately as a chemist can. In evidence of this a table gives the results of "inspection by the eye" and of analyses made by Prof. John W. Langley, of the University of Michigan. The agreement is surprisingly close.

The different articles contain many very useful and practical suggestions, often put into the most concise form. The following are some examples:

"To anneal any piece of steel, heat it red hot; heat it *uniformly* and heat it *through*, taking care not to let the ends and corners get too hot

"When the steel is hot through it should be taken from the fire immediately and forged as quickly as possible.

"A *uniform* heat, as low as will give the required hardness, is the best for hardening.

"The original and proper strength of fine steel can never be *fully restored* after it has once been destroyed by overheating."

With reference to wire gauges, the publishers of this book recommend, what nearly every one has learned who ever investigated the subject with any care, that the use of all wire gauges should be abandoned, and Brown & Sharpe's micrometer sheet metal gauges used instead, which will measure thousandths of an inch accurately, and by which even quarter thousandths may be measured.

To show the effects of heat upon steel, the beautiful experiment, which has been so often repeated by this firm for the entertainment and instruction of visitors at their works, is fully described. It consists in nicking a bar of steel about 1 × ½ in. at intervals of ½ to ¾ in., in eight or nine places, and then heating the bar so that the first section has a white heat, while the last one is at a dull red. If the bar is then plunged into water and cooled and the different sections are broken off, each of the fractures will be different from the others, and will indicate the effect of the degree of heat on the steel. These fractures are beautifully illustrated by a heliotype engraving, as probably no other art could show them.

The paper entitled "Why Does Steel Harden" contains sufficient internal evidence, without the announcement of the authors, that they have not even a theory to offer in answer to the question. The facts which they have observed and report are a good deal scattered, and indicate that the authors' investigations have been conducted in a somewhat disconnected way.

Altogether this little book of 59 pages is a promise of what trade catalogues might and probably will be in the future, when each one will be a practical treatise on the subject to which it refers.

Hydraulic, Steam and Hand-Power Lifting and Pressing Machinery.—By Frederick Colyer, C. E., M. Inst. C. E., M. Inst. M. E. Published by E. & F. N. Spon, London and New York.

The title of this book raised great expectations. Hydraulic machinery for lifting all kinds of heavy objects is now employed so much, and has been developed into such a perfect system in Europe, and is so little known here, that a book on the subject promised to be exceptionally useful to us. It is to be regretted that this expectation is not satisfied by the book before us. An idea of its character may be given by saying that it consists of engravings made by some "process"—and some of them are very badly made—with very brief descriptions of these engravings. There is hardly any discussion of the principles involved in the construction of such machinery, how it should be applied, or the circumstances under which it can be used advantageously. There are engravings of a hydraulic accumulator, pumping engine, working cylinder, cranes of various kinds, a winch and capstans, apparatus for opening dock gates, wagon hoist, canal lift, passenger lift, coal loading and discharging apparatus, gun machinery, truck hoist, a "grid" for raising ships, lifts of various kinds—all operated with hydraulic power. There are also illustrations of steam cranes, hoists and lifts, elevators for grain, "sack tackle," hand-power lifts of various kinds, hydraulic presses, riveting, shearing, bending and flanging machines. The predominance of illustrations of machinery of one or two makers leads to the suspicion of advertising of these firms.

Still, with the exception of several papers read before the English engineering societies, and probably fugitive articles in the technical papers, there is no other literature on the subject; and although Mr. Colyer's book is not what might be wished for, it probably contains more information on the subject of which it treats than can be found elsewhere—excepting, perhaps, in the papers referred to. He has missed, though, an excellent opportunity of making a book that is very much needed.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Connecticut River, annual meeting, at the office in Springfield, Mass., Jan. 18, at noon.

Fitchburg, annual meeting, at the passenger station in Boston, Jan. 31, at 11.30 a. m. The question of an issue of $500,000 new bonds will be submitted to the stockholders.

Dividends.

Dividends have been declared as follows:

Louisville & Nashville, 3 per cent., semi-annual, payable Feb. 10. Transfer books close Jan. 14.

St. Louis & San Francisco, 3½ per cent., semi-annual, on the first-preferred stock, payable Feb. 1. Transfer books close Jan. 17.

Master Car-Builders' Association.

A business and social meeting of the Association will be held at its rooms, No. 113 Liberty street, New York, on Thursday, Jan. 19, at 7 p. m. The subject for discussion at this meeting will be: The Rules Governing Condition of and Repairs to Cars Used in Interchange Traffic.

Members unable to attend are requested to notify the Secretary by letter, stating what changes, if any, are required to make the rules satisfactory.

American Society of Mechanical Engineers.

A regular meeting of this Society is announced to be held in Philadelphia beginning Wednesday, April 13. Members are requested to send their papers to the Secretary in ample time for reference to the Committee on Publication. There will be debate upon papers presented in 1881 before any new papers are read, and members wishing to discuss such papers are asked to study them before the meeting. The last meeting of the Council to pass upon application for membership will be at least 20 days before the meeting.

American Society of Civil Engineers.

The annual meeting will be held at the House of the Society, No. 127 East Twenty-third street, New York, beginning Wednesday, Jan. 18, 1882, at 10 a. m.

The annual reports will be presented; officers of the Society elected; proposed amendments to the constitution discussed. Reports are expected from the standing committees on Gauging of Streams, on Tests of Cements and on Preservation of Timber; also a report from the board of direction on the subject of Tests of American Iron, Steel and Other Metals. These reports will be discussed.

Lunch will be served on Wednesday at the house of the Society. An evening session will be held if found desirable.

Thursday, Jan. 19: Visits will be made to engineering works, among which will be the works of the Manhattan Gas Company, the Hudson River Tunnel, the New York Steam Company, the New York & Brooklyn Bridge. On the evening of Thursday there will be a reception and supper.

Details for the meeting, arranged by a special committee, will be announced at the opening reception.

Members intending to be present who have not already so notified the Secretary are requested to do so at once, that proper provision may be made for the full number.

ELECTIONS AND APPOINTMENTS.

Aurora & Southeastern.—The directors of this new company are: R. G. Person, J. D. Yeomans, H. Hoyt, East Aurora, N. Y.; James Rafferty, P. Rafferty, Java, N. Y.; William Burroughs, Wales, N. Y.; Conrad S. Heinman, Strykersville, N. Y.; Myron P. Bush, George S. Gatchell, Frank H. Goodyear, W. E. Tench, W. R. Haven, John Craigie, Buffalo, N. Y. Mr. Myron P. Bush is President.

Boston & Lowell.—The new board has re-elected Josiah G. Abbott President; C. E. A. Bartlett, Treasurer.

Baltimore & Ohio.—Mr. J. Vansant Smith is appointed General Baggage Agent in place of Anthony Salmon, resigned.

Boston, Concord & Montreal.—Mr. R. M. Bowen has been appointed Cashier in place of C. M. Whittier, deceased. Mr. W. A. Cobb is now General Freight Agent; he was formerly Car Accountant.

Buffalo, Pittsburgh & Western.—At the annual meeting in Philadelphia, Jan. 9, the following were chosen: President, J. W. Jones; directors, Clarence H. Clark, George F. Tyler, Edward A. Rollins, Archer N. Martin, B. K. Jamison, Foster W. Mitchell, Isaac N. Seligman, Harold M. Sill, Calvin H. Allen, Giles E. Taintor, Edward L. Owen. The board of directors has been increased from nine to eleven.

Canadian Pacific.—Mr. J. M. Egan has been appointed Superintendent of the Western Division, including all lines west of Lake Superior. He was recently Division Superintendent on the Chicago, Milwaukee & St. Paul.

Central, of Georgia.—The new board has re-elected Wm. M. Wadley President; W. G. Raoul, Vice-President.

Chartiers & Youghiogheny.—At the annual meeting in Pittsburgh, Jan. 9, the following were chosen: President, J. E. Schwartz; directors, Jacob Henrici, John Reeves, Edward Gregg, George S. Griscom, Henry Hice, Roger Hartley, Thomas MacConnell, Jr., F. B. Hubbell, J. H. Ferguson, J. B. Arnold, Oliver P. Scaife.

Chesapeake & Ohio.—Mr. A. H. Wood has been appointed Assistant General Manager. He was recently Superintendent of the Chicago Division of the Wabash, St. Louis & Pacific road.

The divisions of this road are now as follows: Eastern Division, Newport News to Clifton Forge, Va., E. T. Smith, Superintendent, Richmond, Va.; Huntington Division, Clifton Forge to Huntington, W. P. Harris, Superintendent, Huntington, W. Va.; Lexington Division, Huntington, W. Va., to Lexington, Ky., J. D. Yarrington, Superintendent, Lexington.

Chicago, Freeport & Northwestern.—The officers of the new company are: President, John F. Smith; Vice-President, W. C. Clark; General Manager, A. V. Richards; Secretary, M. H. Wilcoxon; Treasurer, H. J. Porter; Chief Engineer, E. Baldwin. Offices in Freeport, Ill.

Chicago, Milwaukee & St. Paul.—Mr. E. Q. Sewall was appointed Comptroller of this company Jan 1. Mr. Sewall was formerly General Superintendent of the St. Paul & Pacific, then Secretary and Treasurer and lately General Superintendent of the St. Paul & Duluth.

The following circular has been issued: "The following appointments, taking effect Jan. 1, 1882, are hereby announced:

"Mr. Chas. W. Case, Superintendent of the Hastings & Dakota Division, with headquarters at Minneapolis, Minn. Mr. Fred D. Underwood, Superintendent of the Southern Minnesota Division, with headquarters at LaCrosse, Wis. Mr. Henry R. Williams, Superintendent of the Iowa & Minnesota Division, with headquarters at Minneapolis, Minn. Mr. John Jackson, Superintendent of the Sioux City & Dakota Division, with headquarters at Sioux City, Ia.

"Mr. Geo. W. Sanborn continues as Superintendent of the Iowa & Dakota Division and branches, with headquarters as heretofore at Mason City, Ia."

Chicago, St. Louis & New Orleans.—Mr. A. S. Graham has been appointed General Traveling Passenger Agent, with headquarters in New Orleans.

Cincinnati, Georgetown & Portsmouth.—Mr. A. P. Roerer has been appointed General Manager. The office of Superintendent is abolished.

Cincinnati, Hamilton & Dayton.—The following circular from General Manager E. B. Thomas is dated Dec. 31: "The duties of the following named officers of the Cleveland, Columbus, Cincinnati & Indianapolis Railway, with office at Cleveland, are hereby extended over the Cincinnati, Hamilton & Dayton Railway and leased lines: A. J. Smith, General Ticket and Passenger Agent; Edgar Hill, Assistant General Freight Agent; E. C. Sheldon, Paymaster. Appointments taking effect this day."

Cleveland & Pittsburgh.—At the annual meeting in Cleveland, O., Jan. 2, the following directors were chosen: Wm. Bucknell, James F. Clark, Wm. C. Eggleston, E. A. Ferguson, B. F. Jones, Charles Lanier, J. N. McCullough, J. H. Painter, George B. Roberts, Frederick Sturges, R. P. Ranney, Samuel J. Tilden. The road is leased to the Pennsylvania Company.

Dayton & Union.—At the annual meeting in Dayton, O., Jan. 14, the following directors were chosen: James McDaniel, P. Smith, R. D. Marshall, J. H. Devereux, E. B. Poppleton, Stevenson Burke, F. H. Short, John Carlisle. The board elected F. H. Short President; Stevenson Burke, Vice-President; E. B. Thomas, General Manager.

The following circular from General Manager Thomas is dated Jan. 4: "The following persons are hereby appointed officers of the Dayton & Union Railroad Company: Geo. H. Russell, Secretary and Treasurer; Geo. S. Russell, Assistant Secretary and Treasurer; P. A. Hewitt, Auditor; O. B. Skinner, Traffic Manager; Edgar Hill, General Freight Agent; A. J. Smith, General Ticket Agent; J. H. Barrett, Superintendent; H. H. Poppleton, General Attorney; G. M. Beach, General Road-Master; W. F. Turreff, General Master Mechanic; J. L. Yale, Purchasing Agent; T. J. Higgins, Superintendent Telegraph; E. C. Sheldon, Paymaster, with offices at Cleveland, with the exception of J. H. Barrett, Superintendent, who will be addressed at Cincinnati." The new officers are all officers of the Cleveland, Columbus, Cincinnati & Indianapolis Company.

Delaware Western.—At the annual meeting in Wilmington, Jan. 9, the following directors were elected: Robert M. Garrett, Victor Dupont, Perry Belmont, Wm. M. Canby, John W. Davis, Wm. Canby and Osman Latrobe.

Denver & Rio Grande.—The following circular from General Superintendent G. W. Cushing is dated Jan. 1:

"Mr. J. A. Myers is appointed Superintendent of Gunnison Division and branches. Office at Salida. Office of Train-Master discontinued.

"Mr. Cole Lydon is appointed Superintendent Blue and Eagle River branches, with control of tracks at Leadville and Smelters. Office of Train-Master discontinued. In effect this date."

Dorchester & Delaware.—The following officers were recently chosen: President, John Webster; Secretary and Treasurer, E. S. Johnson; Superintendent, Thomas E. Wright.

East Broad Top.—At the annual meeting in Philadelphia, Jan. 9, the following officers were elected for the ensuing year: President, William A. Ingham; Vice-President, Edward Roberts, Jr.; Secretary and Treasurer, William Boyd Jacobs; directors, Ario Pardee, George B. Markle, Edward Roberts, Jr., Edward R. Wood, Percival Roberts, Charles Hacker, Franklin A. Comly.

Ft. Wayne, Cincinnati & Louisville.—The officers of this Company (successor to the Ft. Wayne, Muncie & Cincinnati) are as follows: President, Elijah Smith; General Superintendent, W. W. Worthington; Auditor, Charles Hoffman; General Ticket Agent, George B. Campbell; Assistant General Freight Agent, S. A. Wikel; Master of Transportation, W. B. Beamer. The offices are in Ft. Wayne, Ind., except that of the President, which is in Boston.

Indiana, Illinois & Iowa.—The offices of this company are at Dwight, Ill.; the officers are as follows: President, J. D. Harvey; General Manager, F. M. Drake; Secretary and General Freight and Ticket Agent, T. P. Shonts; Treasurer and Auditor, F. E. Drake; Chief Engineer, Henry Shaw.

Kansas City, Fort Scott & Gulf.—Mr. J. S. Ford has been appointed Comptroller of this company and its leased lines, and as such will perform the duties heretofore exercised by the Auditor, and will have supervision and control over all accounts, except such as appertain to the Treasurer in Boston.

Mr. D. C. Smith is appointed Car Accountant of this company, with office at Kansas City, Mo. All reports and other communications pertaining to that department, excepting settlements of mileage, should be addressed to him.

Kansas City, Lawrence & Southern Kansas.—Mr. J. S. Ford has been appointed Comptroller of this company and its leased lines, and as such will perform the duties heretofore exercised by the Auditor, and will have supervision and control over all accounts, except such as appertain to the Treasurer in Boston.

Mr. D. C. Smith is appointed Car Accountant, with office at Kansas City, Mo.

Kansas City, Springfield & Memphis.—Mr. J. S. Ford has been appointed Comptroller of this company, and as such will perform the duties heretofore exercised by the Auditor, and will have supervision and control over all accounts, except such as appertain to the Treasurer in Boston.

Lancaster & Reading.—This company has elected A. H. Peacock President; W. Leaman, Secretary and Treasurer. The road is leased to the Philadelphia & Reading.

Lehigh Coal & Navigation Lines.—At the annual meeting in Philadelphia, Jan. 9, officers were chosen as follows by the companies named, which are controlled by the Lehigh Coal & Navigation Co., and whose roads are leased by it to the Central of New Jersey: *Nesquehoning Valley.*—President, J. B. Moorhead; directors, Francis R. Cope, Samuel Mason, William G. Moorhead, W. P. Cresson, I. V. Williamson, William C. Ludwig, George Whitney, John W. Thomas, George F. Tyler, P. C. Garrett, T. Charlton Henry, F. C. Yarnall. *Wind Gap & Delaware.*—President, F. C. Yarnall; directors, George Whitney, S. Shepherd, C. F. Howell, E. Hill, E. W. Clark, Jr., W. A. Buchanan. *Lehigh & Lackawanna.*—President, F. C. Yarnall; directors, E. W. Clark, F. R. Cope, Fisher Hazard, Edward Lewis.

Little Schuylkill.—At the annual meeting in Philadelphia, Jan. 11, the following were chosen: President, D. R. Bennett; managers, J. H. Trotter, C. W. Steever, C. D. Reed, C. S. Tyson, H. Handy, T. McKean; Secretary and Treasurer, J. L. Wilson.

Mexican National.—The following circular from General Manager G. Clinton Gardner is dated New York, Dec. 31:

"Engineer S. T. Fuller of the Northern Division of the Texas-Mexican Railway Co. has been appointed General Superintendent and Chief Engineer of the Northern Division of the Mexican National Construction Co. and the Mexican National Railway Co., as also General Superintendent and Chief Engineer of the Texas-Mexican Railway. His duties as General Superintendent and Chief Engineer will extend over all the lines of these companies north of San Luis Potosi, including the Matamoros Division.

"Superintendent W. W. Hungerford has been appointed Superintendent of Construction and will report direct to General Superintendent and Chief Engineer Fuller, taking personal charge of the movement of trains and the track work on the Lampaoas Division, with such other duties as may be assigned to him.

"Principal Assistant Engineer E. Miller will take personal charge of location and surveys, with such construction work as may be assigned to him, reporting direct to General Superintendent and Chief Engineer Fuller."

Mr. Fuller was formerly Chief Engineer of the Philadelphia, Wilmington & Baltimore Railroad.

Missouri Pacific.—The following circular has been issued by Gov. John C. Brown, General Solicitor for this company and its leased and controlled roads:

"1. Thomas J. Portiss, Esq., is appointed as the General Attorney of the Missouri Pacific Railway and branches and leased lines, extending as far south on the Missouri, Kansas & Texas Railway as the Texas state line, and the St. Louis, Iron Mountain & Southern Railway and its extensions. His office will remain at St. Louis.

"2. Thomas J. Campbell, Esq., is appointed General Attorney of the Texas & Pacific Railroad in Texas, and so much of the Missouri Pacific Railway and Missouri, Kansas & Texas Railway lines and branches as are within the state of Texas, with his office in Dallas, Texas.

"3. Messrs. Baker & Botts are appointed the general attorneys of the International & Great Northern Railroad and its branches and extensions, with their office in the city of Houston, Texas.

"4. Messrs. Kennard, Howe & Prentiss are appointed the general attorneys of the Texas & Pacific Railway within the state of Louisiana, and the New Orleans Pacific Railway, with their office in New Orleans."

New York, Brooklyn & Seashore.—This company has elected directors as follows: Charles E. Bogert, Charles S. Braisted, Charles F. Estwick, Samuel Lawrence, Adolph Schiff, William Strauss, William H. Young.

New York City & Northern.—At the annual meeting in New York, Jan. 9, the following directors were elected: R. M. Gallaway, W. R. Garrison, G. J. Forrest, Arthur Leary, J. F. de Navarro, A. V. Stout, C. K. Garrison, Lewis May, A. Hegewisch, J. P. Kennedy, R. C. Livingston, J. F. de Navarro, Jr., and C. F. Woerishoffer.

New York Elevated.—At the annual meeting in New York, Jan. 10, the following directors were chosen: Cyrus W. Field, David Dows, Jay Gould, Russell Sage, John H. Hall, Alfred S. Barnes, George L. Scott, J. H. Lane, Jesse Hoyt, Daniel A. Lindley, Edward M. Field, James D. Smith, James A. Cowing.

New York & New England.—The organization of the board for the ensuing year is as follows: President, James H. Wilson; General Manager, Samuel M. Felton, Jr.; Clerk, W. Perkins; Treasurer, George B. Phippen; Executive Committee, Wm. T. Hart, Legrand B. Cannon, Jonas H. French, Jay Gould, James H. Wilson; Finance Committee, R. Suydam Grant, Cyrus W. Field, Henry L. Higginson, James H. Wilson.

New York, New Haven & Hartford.—At the annual meeting, Jan. 11, the following directors were elected: Chester W. Chapin, Springfield, Mass.; Henry C. Robinson, C. M. Pond, Hartford, Conn.; George H. Watrous, E. M. Reed, E. H. Trowbridge, New Haven, Conn.; Wm. D. Bishop, Bridgeport, Conn.; Nathaniel M. Wheeler, Southport, Conn., Wilson G. Hunt, George M. Miller, A. R. Van Nest, Augustus Schell, Wm. H. Vanderbilt, New York.

Norwich & Worcester.—At the annual meeting, Jan. 11, the following directors were chosen: F. H. Dewey, George W. Gill, Charles W. Smith, E. L. Davis, Worcester, Mass.; John F. Slater, Norwich, Conn.; Wm. J. Weld, Boston; Wm. Bayard Cutting, New York. The board re-elected F. H. Dewey, President.

Ohio & Mississippi.—Mr. W. I. Robinson has been appointed General Baggage Agent, in place of J. T. Avery, resigned.

Pennsylvania.—Mr. Frank L. Sheppard has been appointed Superintendent of the Sunbury, Hazleton & Wilkesbarre Division, in place of A. B. Starr, transferred. He was lately Train Dispatcher on the New York Division.

Pennsylvania & New York.—At the annual meeting in Philadelphia, Jan. 9, the following were chosen: President, Robert A. Packer; directors, Robert H. Sayre, Charles Hartshorne, Victor E. Piollet, Garrett B. Linderman, Harry E. Packer, Robert Lockhart, William H. Sayre, Elisha P. Wilbur, James I. Blakslee, Howard Elmer, Elisha A. Hancock, Frederick Mercur. The road is owned by the Lehigh Valley Company.

Pennsylvania Railroad Leased Lines.—At the annual meetings in Philadelphia, Jan. 9, the following were chosen: *Lock Haven & Clearfield.*—President, J. N. DuBarry; directors, John P. Green, Strickland Kneass, Wistar Morris, G. B. Roberts, N. Parker Shortridge, Edmund Smith. The *Susquehanna & Clearfield* and the *Moshannon & Clearfield* chose the same officers. *River Front.*—Strickland Kneass, President. *Germantown, Norristown & Phœnixville.*—President, A. J. Cassatt: Directors, D. B. Cummins, J. N. DuBarry, H. H. Houston, Henry H. Phillips, G. B. Roberts, N. Parker Shortridge, John C. Sims, Jr., Edmund Smith, Henry D. Welsh, J. Price Wetherill. *Philadelphia & Merion.*—President, G. B. Roberts; directors, A. J. Cassatt, D. B. Cummins, J. N. DuBarry, John P. Green, Strickland Kneass, Wistar Morris, Henry M. Phillips, N. Parker Shortridge, John C. Sims, Jr., Edmund Smith, Henry D. Welsh, J. Price Wetherill.

Pensacola & Atlantic.—The engineer corps of this road is made up as follows: Chief Engineer, A. W. Gloster; division engineers, George B. Pickett, Colin A. Davis; resident engineers in charge of sections, John M. Cook, W. K. Atkinson, Frank Matthews, E. F. Jones, J. B. Billups, Paul Montfort, J. B. Clifton, O. H. Crittenden, A. M. Glassel; Assistant Engineer in charge of piling and bridges, Nesbit Wingfield.

Philadelphia & Erie.—Messrs. Joseph B. Wilson, Charles T. Jeffries and E. A. Gaskill have been nominated as Philadelphia city directors.

Philadelphia & Reading Leased Lines.—At the annual meetings in Philadelphia, Jan. 9, the following were chosen: *North Pennsylvania.*—President, Franklin A. Comly; directors, John Jordan, Jr., Wm. C. Ludwig, Edward C. Knight, Alfred Hunt, Thomas Smith, Ario Pardee, Jas. H. Stephenson, Richard J. Dobbins, Charles A. Sparks, Edwin H. Fitler, Thos. P. Stotesbury, Thomas Cochran. *Chestnut Hill.*—President, Coffin Colket; directors, Joseph Patterson, William L. Schaffer, F. B. Gowen, E. H. Weil, William W. Colket, A. E. Dougherty, W. S. Wilson, Lewis Elkin, Jos. B. Townsend, H. A. Smith, Chas. B. Colket; Secretary and Treasurer, William W. Stephens.

The meetings of the other leased lines were adjourned until Jan. 23, pending the decision as to the control of the lessee company.

Philadelphia, Wilmington & Baltimore.—At the annual meeting in Wilmington, Jan. 9, the following directors were chosen: Isaac Hinckley, S. M. Felton, S. M. Shoemaker, Jacob Tome, Charles Warner, William Sellers, Christian Febiger, George B. Roberts, A. J. Cassatt, John P. Green, J. N. DuBarry, Wistar Morris, Edmund Smith, Henry M. Phillips, Benjamin F. Newcomer, Robert Craven. Mr. Newcomer is the only new director. He succeeds Samuel Harlan, of Wilmington. The board re-elected Isaac Hinckley President; A. J. Cassatt, Vice-President; Robert Craven, Secretary and Treasurer; H. F. Kenney, Superintendent.

Pittsburgh, Chartiers & Youghiogheny.—At the annual meeting in Pittsburgh, Jan. 9, the following were chosen: President, J. E. Schwartz; directors, Jacob Henrici, Henry Hice, John Reeves, Roger Hartley, George S. Griscom, Edward Gregg, E. H. Stowe, O. P. Scaife, John G. MacConnell, Wm. Robinson, Wm. Miller.

Pittsburgh Junction.—At the annual meeting in Pittsburgh, Jan. 9, the following were chosen: E. K. Hyndman, President; John W. Chalfant, Reuben Miller, Thos. M. King, D. W. C. Carroll, Simon Beymer, Wm. Metcalf, R. B. Brown, Campbell B. Herron, James Callery, J. D. Callery, C. P. Ford, H. W. Oliver, Jr., directors.

Pittsburgh & Lake Erie.—At the annual meeting in Pittsburgh, Jan. 9, the following were chosen: President, Jacob Henrici; directors, Ralph Bagaley, James M. Bailey, James I. Bennett, J. H. Devereux, Herbert DuPuy, David Hostetter, John Newell, A. E. W. Painter, John Reeves, J. M. Schoonmaker, M. W. Watson, D. Leet Wilson. The new directors are Messrs. Reeves and Wilson, who succeed W. M. Lyon and John Dunlap."

Pittsburgh & Western.—At the annual meeting in Pittsburgh, Jan. 9, the following were chosen: Jas. Callery, President; John W. Chalfant, H. W. Oliver, Jr., J. Painter, Jr., John E. Downing, E. K. Hyndman, A. M. Marshall, S. Humphreys, W. H. Brown, F. S. Lathrop, G. G. Haven, Russell Sage, directors.

Pittsburgh, Youngstown & Chicago.—At the annual meeting in Pittsburgh, Jan. 9, the following directors were chosen: Chauncy H. Andrews, W. J. Hitchcock, Lucius E. Cochran, Louis Miller, J. H. Wade, S. L. Everett, Wm. Chisholm, W. J. McKinney, Robert Garrett, Wm. S. Bissell, Wm. B. Rodgers, J. A. Caughey, W. M. Short.

Reading & Chesapeake.—Mr. Henry Baumgardner, of Lancaster, Pa., has been chosen President, in place of Samuel L. Fowler, resigned.

St. Johns.—Mr. John N. C. Stockton has been chosen Treasurer, in place of J. M. Hallowes, resigned.

St. Louis, Ft. Scott & Wichita.—The officers of this company are: President, A. M. Ayres; Vice-President and General Manager, Francis Tiernan; Secretary and Treasurer, Ira D. Bronson; General Superintendent, J. D. Hill; Auditor, A. Popkess; General Freight and Ticket Agent, Q. Campbell. Offices in Ft. Scott, Kansas.

St. Paul & Duluth.—Mr. S. R. Stimson has been appointed General Superintendent, in place of Mr. E. Q. Sewall, who has gone to the Chicago, Milwaukee & St. Paul.

Terre Haute & Indianapolis.—At the annual meeting in Terre Haute, Ind., Jan. 2, the following directors were chosen: Josephus Collett, F. C. Crawford, George E. Farrington, Alexander McGregor, W. R. McKeen, D. W. Minshall, Henry Ross. The board elected W. R. McKeen President; George E. Farrington, Secretary; J. W. Cruft, Treasurer.

Terre Haute & Logansport.—This company has elected W. R. McKeen President; George E. Farrington, J. B. Hager, D. W. Minshall, John B. Williams, directors; George E. Farrington, Secretary and Treasurer. The road is worked by the Terre Haute & Indianapolis Company.

Ulster & Delaware.—Mr. F. B. Hibbard has been appointed General Freight and Passenger Agent. Office in Rondout, N. Y.

Wabash, St. Louis & Pacific.—Cincinnati dispatches report that Mr. John C. Gault, late General Manager, has been appointed Second Vice-President and General Traffic Manager. Col. Robert Andrews, late General Superintendent of the Eastern Division, is appointed General Superintendent of all the company's lines, with office in St. Louis. Mr. W. F. Merrill is to be Assistant General Superintendent of the whole line.

The Freight Department is to continue in charge of Mr. A. C. Bird, Superintendent of Freight Traffic. The office of General Ticket Agent is abolished and the Passenger Department consolidated under charge of Mr. H. C. Townsend, General Passenger Agent.

Mr. W. S. Lincoln has been appointed Chief Engineer, in place of E. A. Garvey. Office in St. Louis.

Mr. Andrew A. Allen has been appointed Master of Transportation of the Peoria Division, with office in Peoria, Ill. Mr. N. C. Keeran succeeds Mr. Allen as Agent at Chicago.

Notice is given that from Jan. 1 Frank E. Snow, General Agent at Detroit, will have charge of all business originating between Logansport and Detroit, or received from connecting lines in that district. West-bound business from Logansport remains under the supervision of J. M. Osborn, Commercial Agent at Toledo.

Wisconsin Central.—It is reported that Mr. F. N. Finney has been persuaded to reconsider his resignation, and to resume his position as General Manager of this road.

PERSONAL.

—Mr. George W. Peet, who died at his residence in Canaan, Conn., Jan. 2, was a lawyer of local prominence, and a director of the Housatonic Railroad Company.

—By the changes in Wabash, St. Louis & Pacific officers, noted elsewhere, Mr. Thomas McKissock, General Superintendent of the Western Division, and Mr. George H. Daniels, General Ticket Agent, will be retired. Both are officers of long experience and proved capacity.

—Hon. Edwin W. Stoughton, a well-known New York lawyer, and formerly Minister to Russia, died in New York, Jan. 7. He was counsel for Ross Winans in his famous eight-wheel car patent suit against the Erie, and some years afterwards was counsel for the Erie for several years. He was also engaged in the Woodworth planer cases and other important patent suits.

—Mr. E. J. Cuyler, recently Superintendent of the Wisconsin and Milwaukee divisions of the Chicago & Northwestern road, was, on New Year's day, presented with a valuable diamond ring and set of studs by the conductors and other employés lately under his charge. In thanking his friends, Mr. Cuyler said that he had been on the road 26 years, and was Superintendent when the company controlled less than 100 miles of road.

TRAFFIC AND EARNINGS.

Petroleum.

Exports for four successive years have been in gallons:

	1881.	1880.	1879.	1878.
New York...	368,530,493	266,021,776	291,181,533	216,565,282
Philadelphia.	109,148,399	58,029,089	86,305,933	73,641,581
Baltimore...	18,341,082	15,024,793	24,034,198	38,739,936
Boston.....	10,686,384	10,081,925	6,246,766	3,664,084
Richmond...	215,484	1,092,463	1,408,560	898,000
Portland.....	885	3,351	123,088	497,270
Total....	506,922,647	350,253,400	409,300,078	334,006,153

Compared with 1880 there was an increase in 1881 of 156,700,000 gallons in the total exports, of which gain New York had 102,500,000 and Philadelphia 51,100,000 gallons. The rate of increase was 43.4 per cent. in the total, 38.5 at New York, 88 at Philadelphia and 22 per cent. at Baltimore.

The percentages of the total exported from each port were:

	1881.	1880.	1879.	1878.	1877.	1876.	1875.
New York.....	72.7	75.9	71.1	64.8	70.6	56.7	61.8
Philadelphia....	21.5	16.6	21.1	22.1	13.5	26.2	26.6
Baltimore.....	3.6	4.3	5.9	11.6	12.8	15.9	10.6
Boston.....	2.1	2.9	1.5	1.1	1.2	1.2	1.0
Other places....	0.1	0.3	0.4	0.4	1.9	....	....
Total... ...	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Philadelphia, which lost largely in 1880, has fully recovered its position of 1879 but Baltimore continues to lose in rank, and has ever since 1876. In 1877, when the total exported was 355 millions, it exported 45 millions; last year, the total exports having increased 152 millions, Baltimore fell to 18 millions. Philadelphia had its largest share of the exports in 1875, but it has gained in quantity since then 45 million gallons. New York having gained 220 millions.

Hogs and Provisions.

The number of hogs packed in the Northwest during the first half of the winter packing season, that is, in the months of November and December, has been as follows for three successive years:

	1881.	1880.	1879.
No. packed..... ...	3,678,582	4,734,837	4,416,413

The number in 1881 was 1,056,255, or 22¼ per cent. less than in 1880 and 19 per cent. less than in 1879. Compared with 1880, there is a decrease at every leading packing point except Milwaukee, 17 per cent. at Chicago, 30 per cent. at Cincinnati, 36½ per cent. at St. Louis, 40 per cent. at Indianapolis, and 42 per cent. at Louisville. There is a decrease also at nearly all the smaller packing towns west of

the Mississippi except at Sioux City, Omaha and St. Joseph.

During the period the shipments of hog products from Chicago and the exports from Atlantic ports have been in tons:

	1881.	1880.	Dec.	P. c.
Chicago shipments	99,806	140,414	40,608	29.0
Exports	80,280	117,135	36,855	31.5

Rates on provisions from Chicago to New York are 10 cents per 100 lbs. now, against 40 cents last year.

Chicago and Milwaukee Receipts.

For the first week of January receipts have been for four successive years:

	1879.	1880.	1881.	1882.
Chicago:				
Grain, bu	1,652,486	2,567,005	1,355,088	1,554,187
Flour, bbls	55,417	61,828	91,839	95,748
Hogs, No	198,147	106,881	150,565	184,002
Milwaukee:				
Grain, bu	476,383	500,673	406,610	429,905
Flour, bbls	44,982	44,705	81,352	64,000
Hogs, No	28,577	14,272	17,162	16,713

At both places grain receipts were larger than last year, but smaller than in the other two years. Reducing flour to bushels, the aggregate receipts of the two places have been, in bushels:

	1879.	1880.	1881.	1882.
Flour and grain	2,580,665	3,547,076	2,641,057	2,700,258

This is an increase of 1⅛ per cent. over the receipts of 1881, a decrease of 24 per cent. from those of 1880, and an increase of 4.6 per cent. from those of 1879.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Year ending Dec. 31:				
Bur., Cedar Rap. & No	$2,259,037	$2,053,484	I. $205,553	20.2
Central Pacific	23,947,951	20,508,112	I. 3,439,839	16.8
Chi. & Alton	7,553,988	7,718,198	D. 164,210	2.1
Chicago, Mil. & St. P.	17,026,000	13,086,112	I. 3,939,838	30.1
Chi. & Northwest	21,838,931	19,416,009	I. 2,419,922	12.4
Chi., St. P., M. & O.	3,981,296	3,122,097	I. 859,199	27.7
Cin., Ind., St. L. & Chi	2,296,916	2,412,185	D. 115,269	4.7
Denver & R. G	6,206,813	3,478,007	I. 2,728,806	78.5
Flint & Pere M	1,858,255	1,596,948	I. 261,307	16.3
Great Western	5,212,553	5,175,546	I. 57,007	1.1
Hann. & St. Jo	2,230,968	2,489,037	D. 258,071	10.3
Ill. Cent., Ill. lines	6,686,280	6,528,745	I. 157,535	2.4
Iowa lines	1,856,662	1,775,488	I. 81,174	4.6
Ind., Dec. & Spr	503,008	429,192	I. 73,816	17.2
Lake Erie & West	1,373,012	1,184,161	I. 188,851	16.0
Louis. & Nash	11,326,859	9,491,346	I. 1,835,513	19.2
Mem. & Charleston	1,235,091	1,168,545	I. 66,547	5.7
Mil., L. S. & West	630,822	427,751	I. 203,071	47.3
Mobile & Ohio	2,406,437	2,273,622	I. 132,815	5.8
Northern Pacific	4,044,576	2,629,710	I. 1,414,866	53.8
Or. Ry. & Nav	4,391,681	3,338,008	I. 1,053,673	31.7
Peo., Dec. & Ev	688,073	448,928	I. 239,145	53.2
St. L., A. & T. H., Main Line	1,371,034	1,417,662	D. 46,628	3.3
Belleville Line	741,767	729,074	I. 12,693	1.8
St. L. & San Fran	3,160,245	2,693,572	I. 466,673	17.3
St. P., Minn. & Man	4,878,960	3,160,231	I. 1,718,729	54.4
Scioto Valley	439,741	317,065	I. 122,679	38.7
Union Pacific	27,451,831	23,448,445	I. 4,003,386	17.0
Wab., St. L. & P	14,461,570	12,336,152	I. 2,125,418	17.3
Eleven months ending Nov. 30:				
N. Y., Pa. & Ohio	$4,926,164	$4,793,976	I. $132,188	2.3
Month of October:				
N. Y. & N. Eng	$261,200	....	.....	....
Net earnings	79,338	....	.....	....
St. John & Maine	11,757	$10,502	I. $1,255	12.0
Net earnings	861	2,261	D. 1,400	60.9
Month of November:				
Grand Trunk	£193,476	£196,726	D. £3,250	1.6
Net earnings	52,195	61,006	D. 8,811	14.4
Great Western	80,897	86,014	D. 5,117	6.0
Net earnings	20,795	32,281	D. 11,486	35.9
N. Y., Pa. & Ohio	$432,511	$452,691	D. $20,180	4.4
Month of December:				
Bur., Cedar Rap. & No	$232,812	$163,419	I. $39,393	20.4
Balt. & Ohio	1,617,688	1,440,279	I. 177,409	12.3
Central Iowa	99,278	81,402	I. 17,876	22.1
Central Pacific	2,110,000	1,905,221	I. 204,779	10.7
Chi. & Alton	635,307	574,695	I. 60,612	10.6
Chi. & Eastern Ill	151,671	128,981	I. 22,690	17.6
Chi. & Gd. Trunk	139,723	115,272	I. 24,451	21.3
Chi., Mil. & St. P	1,855,000	1,397,308	I. 457,692	32.7
Chi. & Northwest	1,835,200	1,477,902	I. 357,298	24.2
Chi., St. P., M. & O	391,950	312,173	I. 79,777	25.5
Cin., Ind., St. L. & Chi	192,623	198,254	D. 5,632	2.8
Col., H. Val. & Tol	261,223	202,969	I. 58,254	28.7
Denver & R. G	643,417	349,196	I. 294,221	84.1
Det., Lan. & No	120,241	96,192	I. 24,049	25.0
Flint & Pere M	168,821	151,112	I. 17,709	11.7
Gulf, Col. & S. F	140,068	82,063	I. 58,005	70.7
Hann. & St. Jo	180,376	207,281	D. 26,905	13.0
Ill. Cen., Ill. lines	539,190	522,565	I. 16,625	3.2
Iowa lines	169,964	150,616	I. 19,348	12.8
Ind., Bloom. & W	156,697	162,764	D. 6,067	3.7
Ind., Dec. & Spr	37,998	37,893	I. 105	0.3
Lake Erie & West	107,904	102,503	I. 5,401	5.2
Louis. & Nash	1,122,285	949,185	I. 173,100	18.2
Long Island	134,780	104,374	I. 30,406	29.2
Mem. & Charleston	137,400	157,593	D. 20,193	12.7
Mil., Lake Sh. & W	61,845	40,146	I. 21,699	54.2
Mobile & Ohio	262,025	287,372	D. 25,347	8.8
N. Y. & N. England	237,729	198,107	I. 39,622	20.0
Norfolk & West	196,789	181,746	I. 15,043	8.3
Northern Pacific	434,331	220,993	I. 213,338	96.9
Ohio Central	80,020	25,768	I. 54,252	247.1
Peo., Dec. & Ev	58,705	37,159	I. 21,546	58.2
St. L., A. & T. H., Main Line	86,009	101,950	D. 15,941	15.3
Belleville Line	67,843	82,552	D. 14,709	18.0
St. L. & San Fran	287,914	222,855	I. 65,059	29.2
St. P., Minn. & Man	528,563	297,641	I. 230,622	77.4
Scioto Valley	43,741	24,802	I. 18,939	75.8
Tol., Del. & Bur	74,059	44,874	I. 29,185	64.7
Union Pacific	2,267,004	1,869,835	I. 397,169	21.2
Wab., St. L. & P	1,328,276	962,608	I. 365,670	38.0
Week ending Dec. 17:				
Grand Trunk	£44,678	£46,181	D. £1,503	3.3
Week ending Dec. 24:				
Grand Trunk	£45,594	£43,921	I. £1,673	3.8

First week in January:	1882.	1881.		
Denver & R. G	$123,637	$69,318	I. $54,319	78.7
St. L. & San Fran	54,700	46,900	I. 7,800	16.6

For a number of these figures we are indebted to the *Commercial and Financial Chronicle.*

Grain Movement.

For the week ending Dec. 31 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past four years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1878	3,155,513	1,183,148	2,147,844
1879	4,232,089	1,096,747	3,114,803
1880	2,801,700	1,648,451	2,510,233
1881	2,517,142	1,629,536	1,887,007

The receipts of the Northwestern markets in 1881 are about 10 per cent. less than in the corresponding week of 1880, and much less than in the other two years. They are also about a million bushels (30 per cent.) less than the week before, and the lightest of the year with the exception of three weeks in February; but receipts are usually light in holiday week. The shipments of these markets are about the same as the year before, and much larger than in the other two years, and are large shipments for a winter week, though a little less than in the previous weeks of this winter. The Atlantic receipts are a quarter less than in the corresponding week of 1880 and 40 per cent. less than in 1879, though freight rates were twice as high in both those years. In 1879 the earnings on these receipts east of Chicago and St. Louis must have been something like $700,000, in 1880 $480,000, in 1881 not more than $150,000—at least, about in that proportion to each other.

Of the Northwestern receipts for the week Chicago had 30.3 per cent., Milwaukee 25.4, St. Louis 22, Peoria 13, Detroit 3.5, Toledo 3.3, Cleveland 2.5. Of a total decrease of 999,000 bushels from the previous week, 750,000 was at Chicago, while there was a considerable gain at Milwaukee, which had larger receipts in but one week of 1881.

Of the Atlantic receipts New York had 35.2 per cent., Baltimore 19.5, Boston 15.8, Philadelphia 13.2, New Orleans 12.8, Portland 2.3, and Montreal 1.2 per cent. The New Orleans receipts are the largest since the last week of September, and with that and one other exception are the largest since July. They were larger in December than in any other month since July, and 60 per cent. larger than in December, 1880, when, however, they were much smaller than in any other month of the year, the river having been obstructed by ice.

Exports from Atlantic ports for five successive weeks have been:

1881.	Week ending. Jan. 4.	Dec. 28.	Dec. 21.	Dec. 14.	Dec 7.
Flour, bls	34,103	66,129	62,049	16,438	55,378
Grain, bu	1,051,474	1,405,955	1,262,107	982,004	1,891,384
1880.					
Flour, bls	120,499	157,060	138,389	153,302	132,999
Grain, bu	2,206,164	2,611,377	2,363,848	2,646,707	2,469,577

Receipts and shipments at Chicago and Milwaukee for the week ending Jan. 7 were:

	1882.	1881.	Inc. or Dec.	P. c.
Receipts	1,585,947	1,394,621	Inc. 191,326	13.7
Shipments	1,210,507	1,247,982	Dec. 37,475	3.0

At this time last year receipts were reduced by snow blockades.

The receipts at four Eastern ports for the same week ending Jan. 7 were:

	New York.	Boston.	Phila.	Baltimore.	Total.
1882	632,613	232,750	117,650	241,403	1,224,416
P. c. of total	51.7	19.0	9.6	19.7	100.0
1881	490,483	301,876	144,700	302,609	1,239,668
P. c. of total	39.6	24.3	11.7	24.4	100.0

The receipts in 1881 were extraordinarily small, especially at New York.

Coal Movement.

Anthracite tonnages for the year ending Dec. 31 are reported as follows, the tonnage in each case being only that originating on the line to which it is credited:

	1881.	1880.	Inc. or Dec.	P. c.
Phila. & Reading	7,066,615	5,973,312	I. 1,093,303	18.3
Northern Central, Shamokin Div. and Summit Br. R. R	1,050,000	869,632	I. 180,368	20.7
Sunbury, Hazleton & Wilkesbarre	38,000	6,172	I. 31,828	530.0
Pennsylvania Canal	457,260	457,629	D. 369	0.1
Central of N. J., Lehigh Div	4,575,996	3,791,504	I. 784,492	20.7
Lehigh Valley	5,753,622	4,484,339	I. 1,269,283	28.3
Pennsylvania & N. Y.	107,986	39,441	I. 68,545	173.8
Del., Lacka. & Western	4,350,991	3,539,086	I. 811,905	22.9
Del. & Hudson Canal Co.	3,656,356	3,047,594	I. 608,762	19.9
Pennsylvania Coal Co.	1,427,748	1,123,585	I. 304,163	27.1
State Line & Sullivan	64,325	49,972	I. 14,353	28.7
Total anthracite	28,548,899	23,382,266	I. 5,166,633	22.1

The tonnage of anthracite for the corresponding period for six years has been:

1881	28,548,899	1878	17,127,681
1880	23,382,266	1877	20,134,739
1879	25,888,973	1876	18,105,339

The tonnage of 1881 is the largest yet recorded.

The anthracite tonnage of the Belvidere Division, Pennsylvania Railroad, for the year was as follows:

	1881.	1880.	Increase.	P. c.
Coal Port for shipment	84,399	52,170	32,229	62.0
S. Amboy for shipment	693,551	508,438	185,113	36.4
Local points on N. J. lines	732,082	515,611	216,471	41.9
Co.'s use on N. J. lines	115,851	106,062	9,789	9.2
Total	1,625,883	1,182,281	443,602	37.5

Of the total in 1881, 1,354,436 tons were from the Lehigh and 271,447 tons from the Wyoming Region, against 959,603 tons Lehigh and 222,678 tons Wyoming coal in 1880.

The coal tonnage of the Tyrone & Clearfield road and branches for the year was: 1881, 2,401,987; 1880, 1,739,872; increase, 662,115 tons, or 38.1 per cent.

Shipments of Cumberland coal away from the region for the year were as follows:

	1881.	1880.	Inc. or Dec.	P. c.
Balt. & Ohio	1,443,755	1,200,445	I. 243,310	20.3
Bedford Div., Pa. R. R	278,598	213,418	I. 65,180	30.6
Ches. & Ohio Canal	505,365	602,636	D. 97,271	16.1
Total	2,227,718	2,016,499	I. 211,219	10.5

Shipments from the mines are reported as follows: Cumberland & Pennsylvania road, 1,930,648; George's Creek & Cumberland, 211,955; Baltimore & Ohio, 77,576; West Virginia Central & Pittsburgh, 11,257; total, 2,231,436 tons.

Of the Chesapeake & Ohio Canal tonnage, 429,218 tons went to Georgetown and Alexandria for shipment, the balance to local points.

Actual tonnage passing over the Huntingdon & Broad Top road for the year was as follows:

	1881.	1880.	Increase.	P. c.
Broad Top	204,819	174,736	30,083	17.2
Cumberland	313,601	242,594	71,007	29.2
Total	518,420	417,330	101,000	24.3

The Broad Top coal is mined on the line; the Cumberland carried through for the Pennsylvania Railroad.

Total shipments of the Barclay Railroad & Coal Company for the year were: 1881, 418,207; 1880, 465,979; decrease, 47,702 tons or 10.2 per cent.

Other reports of semi-bituminous and bituminous shipments are late, as usual the last week of the year, and the full tables cannot be made up as yet.

Shipments of coal from the mines about Rich Hill, Mo., in December were: by Kansas City, Ft. Scott & Gulf road, 1,648 car-loads; by Missouri Pacific, 2,083 car-loads; total, 3,731 car-loads, an increase of 505 car-loads over the month of November.

Shipments of coal over the Columbus, Hocking Valley & Toledo road for the eleven months ending Nov. 30, were 1,289,451 tons. November shipments were 152,372 tons.

San Francisco coal receipts in 1881 were 878,900 tons, as follows: Pacific Coast coal, 290,800; British Columbia, 151,000; Eastern (anthracite and Cumberland), 26,900; Australian, 124,800; European, 285,400; total, 878,900.

Ticket Commissions.

Mr. A. V. H. Carpenter, General Passenger and Ticket Agent of the Chicago, Milwaukee & St. Paul, announces that his company will, until further notice, pay commissions on the sale of tickets from Chicago and Milwaukee to all points on its own lines, and also to all points on connecting lines north of St. Paul or Minneapolis. The commissions are paid by the company direct. The commission rates to the principal points on the Milwaukee & St. Paul, and its connections north of St. Paul, range all the way from 50 cents to $3 on each ticket. Mr. Carpenter states that he is compelled to pay those commissions to meet the competition of competing lines, all of which are paying those commission rates to ticket agents.

Mr. Marvin Hughitt, General Manager of the Chicago & Northwestern, calls attention to the resolutions passed by the general passenger and ticket agents at their meeting in this city about two weeks ago, prohibiting ticket agents from receiving commissions for the sale of tickets; and Mr. Hughitt wants the ticket agents on his lines to comply with the provisions of the agreement. The Northwestern, however, like the Milwaukee & St. Paul, continues to offer commissions for the sale of tickets to ticket agents of other roads, no matter whether those ticket agents are with roads which are parties to the agreement or not.—*Chicago Tribune.*

Pacific Through Freights.

Shipments of through freight eastward from California in November were as follows, in tons:

	Central Pacific.	Southern Pac.	Total.
San Francisco	5,819	1,267	7,086
Interior points	2,433	819	3,252
Total	8,252	2,086	10,338

Leading items of freight were 728 tons barley, 813 tons wool, 638 tons salmon and 530 tons beans.

Setting aside 555 tons from Los Angeles, which is not likely to go to the Central at all, the Southern Pacific had 15.6 per cent. of the shipments.

Illinois Corn Crop.

The State Board of Agriculture has issued a statement of the acreage and production of corn in Illinois in 1881 in the several counties and in the grand divisions of the state. It shows a total production of 174,995,707 bushels from 7,157,434 acres, which is an average yield for the whole state of 24.4 bushels per acre. In the "Northern Division" of the state, which extends from the Wisconsin line about as far south as the line of the old Toledo, Peoria & Warsaw road—about as far as the southern line of Iowa—3,209,529 acres produced 83,016,519 bushels, or about 25.9 bushels per acre; in the "Central Division," which includes 35 counties and extends about 100 miles from north to south, the southern limit being on a line parallel with and about 30 miles north of the Ohio & Mississippi Railroad, 3,023,004 acres produced 86,670,009 bushels, or 28.7 bushels per acre; and in the "Southern Division" (34 counties), 924,801 acres produced 5,309,179 bushels, or only 5.74 bushels per acre. It will be noticed that the acreage in the Southern Division is small. A large portion of it is wooded, and the proportion of surface cultivated is much smaller than further north. The area of very light yield extends a little further north than this "Southern Division," and includes nearly every county south of the Indianapolis & St. Louis road. Taking these counties from the "Central Division," 31 counties remaining have an average production of 30.8 bushels per acre, which is a very fair crop, though something below the average in those counties. Nearly all the Illinois lines of the Wabash are in this division, also the Indiana, Bloomington & Northwestern, and the Peoria, Decatur & Evansville, and large parts of the Illinois Central, the Chicago & Alton, and a little of the Chicago, Bloomington & Quincy. The production in the Northern Division is lighter, but the crop is by no means a failure there, and at present prices it is probably an unusually profitable one. It is only in the southern part of the state that there was a disastrous failure, and it was there that the failure of the wheat crop was greatest, though there was a very great falling off in central Illinois also. Northern Illinois does not raise enough wheat to be much affected by the yield.

RAILROAD LAW.

Liability for Act of Agent.

In Erwin against the Nashville, Chattanooga & St. Louis Co. in the Tennessee Supreme Court, a station agent, having charge of the rolling stock, trains, etc., of a railroad company, sent an engine with two passengers to overtake a train that had just left the station, the engine collided with the train, and the engineer and one of the passengers on the engine jumped off and were thereby injured.

Held, That the company was liable, and that the fact a conductor charged fare from the point overtaken was of no consequence.

Injury to Employe—Tennessee Law.

In Wheless against the Nashville, Chattanooga & St. Louis Co., the Tennessee Supreme Court lately decided as follows: The general rule of the common law is that a master is not responsible to the servant for injuries resulting from the negligence of a fellow servant in a common employment, where due care is taken in the selection and employment of the fellow servant.

Exceptions to this rule in Tennessee are:

First, where two servants are engaged in different departments of service.

Second, where one servant is the immediate superior of the other, with authority to order and direct the latter in his duties.

It will depend upon the facts of the case if the engineer is to be considered as the superior of the brakeman injured by the negligence of the former, both belonging to the same crew and engaged in common employment at the time of the accident.

Bridge Over Navigable Stream.

In Ward against the Louisville & Nashville Co., the Tennessee Supreme Court lately held that where the Legislature granted the privilege of constructing a bridge over a navigable stream it is upon the obligation to so construct the work as to not impair more than necessary the navigation of the river. They require that the work shall be constructed in this manner and kept in this condition.

The evident intention of the decision is that the obligation not to obstruct navigation is always implied, even when not expressed in terms.

THE SCRAP HEAP.

Locomotive Building.

The Rhode Island Locomotive Works in Providence have an order for 10 heavy passenger engines for the Grand Trunk road.

The Marquette, Houghton & Ontonagon shops at Marquette, Mich., are building two mogul freight engines with 18 by 24-in. cylinders

The Rogers Locomotive Works at Paterson, N. J., is just completing an order for eight consolidation engines for the Nashville, Chattanooga & St. Louis.

It is said that the Cumberland & Pennsylvania shops at Mt. Savage, Ind., have taken orders for several locomotives for other roads. The shops can turn out about one engine a month, in addition to doing the repair work of the road.

Mr. Nathaniel McKay, formerly of McKay & Aldus, for many years locomotive builders at Boston, and well-known to nearly all of the older railroad officers in this country, is engaged in importing foreign locomotives, made to American specifications. His office is at No. 39 Broadway, New York.

The Wyoming Valley Manufacturing Company at Wilkesbarre, Pa., has lately shipped two Mogul engines of 3-ft gauge to the Port Huron & Northwestern road and a mining tank engine of 29-in. gauge to the Fall Brook Coal Company. The shops are running over time.

The Pennsylvania Railroad shops at Altoona are to build this year 195 new locomotives, 40 of which are to be of the consolidation pattern.

The Wilmington (Del.) *Republican* says: "It is stated that the Dredging Company has sold 20 acres of land to an Eastern company, which will erect large locomotive works on the same. It is said that operations will be commenced in six month's time, and a large number of workmen will be employed."

Car Notes.

A company has been formed in Rochester, N. Y., with a capital of $500,000, for the purpose of building railroad cars. It is said that the new concern will lease or buy the old New York Central shops in East Rochester, and will make extensive additions to them.

The Pittsburgh, Ft. Wayne & Chicago shops in Allegheny, Pa., last year built 4 passenger, 1 combination, 2 mail and express, 20 caboose and 800 freight cars, besides repair work and the rebuilding of old cars.

A correspondent requests us to state that the Chicago Car Roofing Co., whose proposed removal to Wheeling was lately noted, is not the Empire Car Roofing Co., of Chicago. The Empire Co. also buys sheet iron largely from the Whittaker Mill at Wheeling.

The Flowers Sleeping Car Co. has been organized at Bangor, Me., with $500,000 capital and the following officers: President, William Flowers; Secretary, F. M. Laughton; Treasurer, W. J. Webb. The company intends to build, lease and operate sleeping cars under a patent granted to Wm. Flowers in 1874. The car is built with a partition (which can be removed in the day-time) running through the middle, and the seats in the day-time and berths at night are made up next to the partition, with a space outside next to the windows.

The Wason Manufacturing Company, at Brightwood (Springfield), Mass., recently shipped one combination and three passenger cars to the Indianapolis & Evansville road.

Iron and Manufacturing Notes.

The Columbus (O.) Rolling Mill is nearly ready to begin the manufacture of steel rails. A contract for 6,000 tons will be the first work.

Mr. James V. Umberger takes charge of the iron department of the business of Thomas B. Inness & Co., of No. 55 and 57 Pine street, New York. Mr. Inness continues to give his attention to supplying rails and fastenings and equipment.

Andrews, Brothers & Co. are adding a number of new puddling furnaces to their rolling mill at Haselton, O.

The Indianapolis Rolling Mill Co. has elected Aquilla Jones President; John Thomas, Treasurer; S. W. Morgan, Secretary.

Morgan, Williams & Co., at Alliance, O., shipped in the month of December, 1881, over 547 net tons of machinery, including steam hammers, hydraulic, punching and shearing machinery, etc, to the following places: Pittsburgh; Beaver Falls; Johnstown; McKeesport, Pa.; St. Louis; Louisville; Boston; Chicago; South Pueblo, Col.; Troy, N. Y.; Cleveland; Columbus, O., and Cincinnati.

The Siemens-Anderson Steel Co., of Pittsburgh, is reported in an embarrassed condition, and attachments to a large amount have been placed upon its property. The assets, it is said, exceed the liabilities, and there is a probability that some arrangement will be made with the creditors.

The Rail Market.

The *Iron Age* reviews the rail market for 1881 as follows; "An enormous business has been done in steel rails during the past year. Production during 1881 is estimated at 1,700,000 gross tons, to which must be added imports of nearly 300,000 tons (iron and steel), making a total supply for the year of about 2,000,000 gross tons. Prices have been remarkably steady, the general quotation having been $60 at mill almost without deviation. In some cases $2 or $3 extra were paid for early deliveries, and in others similar concessions were made for deliveries at sellers' option. Next to the enormous consumption, the rapid development in production is one of the most striking features of the year. The output can be largely increased, if necessary, during 1882, several of the leading mills having made extensive additions, besides two or three entirely new concerns that have been, or will be shortly, put in operation. It is quite probable, in fact, that the capacity of Pennsylvania alone will reach 1,000,000 tons per annum by midsummer. It is clear, therefore, that there is very little necessity for importing rails, and henceforth manufacturers will endeavor to supply the market from domestic sources. Prices are being cut down so as to meet outside competition, and it is understood that $2 to $3 concessions have been made in recent transactions. It cannot be said that the outlook is free from perplexities. The vast consumption of the past two years can hardly be maintained, although the ability to meet such a demand is stronger than ever; in point of fact, the key to the entire position of the iron trade is likely to be found in this direction. If the steel works can be kept busy, other branches will be. There is some little uneasiness felt in regard to re-sales, which are regarded as indications that deliveries are not taken as promptly as was expected. This may be only temporary; but, in the meantime, parties with cash behind them can obtain better terms than was thought possible a little while back, and the feeling inclines toward weakness. The imports of steel blooms for the year will aggregate nearly 150,000 tons, at an average cost of probably $43, duty paid, or in rails $53 to $55 at mill. The iron rail trade was very active, the mills having been fully engaged during the entire year, either on steel blooms or in rerolling iron. Prices have been uniformly steady, $47 being the quotation during almost the entire year—varying probably $1 per ton on large orders, according to the price of material, $46 being the lowest quotation and $48.50 the highest for standard rails—the great bulk of business having been done at an average of about $47 at mill. The outlook in the iron rail trade is not encouraging, many of the mills having virtually abandoned the business, and are now employed on merchant iron, steel blooms, or such small orders as may be offered from time to time for iron rails. The general opinion is that competition with steel rails is impossible, and that the day for iron rails is passed."

For old iron rails the year opens with quotations nominally $29.50 per ton in Philadelphia for tees and $30.50 for double-heads, but with a very dull market and no sales reported.

Locomotive Tests.

The Fontaine locomotive has finally been transferred from the Pennsylvania Railroad to the New York Central. It was taken by boat from Jersey City to Mott Haven, and will soon be put to a practical trial by drawing the New York Central's fast train between New York and Albany.

A Train Wrecker's Sentence.

Jacob Fisher, who some time ago misplaced a switch on the Lehigh Valley road at Neshanic, N. J., and thereby threw a passenger train from the track, was tried recently in the Somerset County Court, found guilty and sentenced to five years' imprisonment. Evidently there is not much sympathy for train-wreckers in New Jersey.

Sale of Pullman Cars.

In Baltimore, Jan. 5, R. T. Baldwin, Receiver, sold at public auction 29 sleeping cars, 3 parlor cars and the trucks of a car which had been burned, the sale being made under an order of the United States Circuit Court in the suit between the Baltimore & Ohio and Pullman's Palace Car Co., arising out of the former partnership of the two companies in the sleeping car business. The cars are in good order, but the bedding, etc., somewhat worn. The order requires the cars to be delivered from Mt. Clare station, and the purchasers are guaranteed the right to use them in travel without molestation by patentee. The Baltimore & Ohio Company bought 18 cars and the truck of the burned car; the Jackson & Sharp Co. bought six cars, and the remaining eight were sold to a buyer who gave his name as "W. G.," and who was reported to be an agent of the Wagner Co. The sale produced $158,365, an average of $4,949 per car, less than one-third of the original cost.

Carrying Home His Bonds.

The St. Paul *Pioneer-Press* of Jan. 3 says: "Mr. Selah Chamberlain, of Cleveland, who for 20 years has been the Nemesis of the state of Minnesota, had brought this strange-looking coach to St. Paul to take home his $200,000 of cash and $2,000,000 of new bonds, which were his share of the debt payment. Mr. Chamberlain applied first to the American Express Co. to transport his newly-acquired wealth to Cleveland, but the danger from robbery, fire or accident was so great that the sum of $3,500 was asked by the company for the service, which was equivalent to a tax of over 1½ mills for the exchange. Mr. Chamberlain thought this an exorbitant charge, and he cast about for another and better way. He is a large stockholder in the Chicago, Milwaukee & St. Paul road as well as of the Cleveland, Tuscarawas Valley & Wheeling road. He accordingly took the President's car of the latter road and was taken over the track of the former road as an invited guest. The attorneys of Mr. Chamberlain in this city, Messrs. Cole, Gilman and Skinner, who had charge of the shipments of the bonds, had their arrangements made to get them off in the special car on the noon train; but when the bonds were taken to the safe aboard the car, it was found they were so bulky it would not hold them. They had been printed on heavier paper than that usually used, and Mr. Chamberlain's 2,000 bonds, and some 500 which were consigned in his care to other creditors of the state, would nearly have filled two such safes as the one provided.

"The dilemma was an ugly one, and the car was held over until evening. It was finally decided to send them on that night, putting as many as possible in the safe and the rest in the trunk, keeping a strong guard over them. Five men, well armed and abundantly supplied with food, accordingly took up their quarters over the precious freightage of parchment, and as the evening train on the Milwaukee & St. Paul road pulled out Saturday night it took within the innocent four walls of that queer-looking Ohio car the magnificent fortune for which Mr. Chamberlain has fought all these long years with the determination of a sleuth-hound and the litigious genius of a Mr. Gammon. Yesterday the treasure reached Cleveland in safety, having encountered neither moth nor rust, robbers nor fire. There they were formally delivered to Mr. Chamberlain."

Paying Off Old Debts.

In January, 1879, the firm of Ferris & Miles, engaged in the manufacture of machinists' tools in Philadelphia, failed with an indebtedness of about one hundred thousand dollars, and made an assignment for the benefit of their creditors. James Dougherty, Esq., became the purchaser of the works at the sheriff's sale, and the business was continued under the title of "The Machine Tool Works" and the management of Mr. Fred. B. Miles, one of the original firm.

The friends and acquaintances of Mr. Miles will congratulate him on hearing that at the beginning of the year he settled the balance due to creditors, and to-day every creditor of the late firm of Ferris & Miles has been paid his claim in full. The business has never been so prosperous as now, and the work the establishment turns out ranks with that of the older and celebrated machine-tool makers of Philadelphia. Under the management of Mr. Miles it seems probable that it will become necessary to print the definite article of the title of "The Machine Tool Works" in italics.

Railroad Building under Difficulties.

The track of the St. Louis, Jerseyville & Springfield Railroad was completed to the river at Elsah by Jan. 1, 1882, fulfilling the promise of the company, which was made in the obligations for right of way and subscription to the road along their route from Bates to Elsah, a distance of 71 miles. This road was projected scarcely one year ago as a great personal enterprise by the late James A. Locke. The eventful year of 1881 presented obstacles, physical and moral, which rendered almost herculean the completion of the road, as promised, by Jan. 1, 1882. The severity and length of the winter of 1880–1881 made it impossible to commence grading the road until May. The general demand for labor made it hard to obtain men and teams, and Harris Brothers, contractors, were forced to purchase 100 pairs of mules, but when harvest came the laborers went into the fields at advanced wages, leaving the teams without drivers. Foreign hands were secured, but the coming drought drove a large portion of the force to sinking wells and hauling water long distances for the supply of man and beast, while the unprecedented heat nearly paralyzed both, not a few perishing. Refreshing rains came at last, but in such floods that lumber could scarcely be moved for bridging, while slime filled the cuts, and mud had to be shoveled from the scrapers. For two months after Oct. 1 another formidable obstacle presented itself—hard-pan so tough that dynamite was used for upheaval before an eight-mule team to each plow could make any impression. From this cause alone, in a single section of 15 miles, the cost of grading exceeded the largest estimate of the contractors fully $8,000, greatly delaying the work. In June James A. Locke died suddenly after three days' illness, when his brother, Morris R. Locke, succeeded him in the presidency of the road. The sad event brought new cares and embarrassments, which, however, were not permitted to retard the enterprise. Then, as incidents, came pink-eye to horses, while the breaking out of small-pox created almost a panic in the last month of the year. Nothing daunted, C. S. Martin, the Chief Engineer, pushed the work day and night seven days a week. Finally, to cap the climax, 350 feet of trestle-work, 40 ft. high, just erected near Elsah, were razed to the ground one night, a piece of vandalism deprecated alike by all good citizens. Engineer Martin ordered 15 cars of new lumber and a large additional force of carpenters, and Samuel Bothwell & Co., bridge-contractors, delayed only two days, but just enough to consume the last hour of the last day of the year to get the road to the river. These are a few sample obstacles to the construction of the road in eight months, and, under the circumstances, it may be considered a prodigy of railway enterprise, reflecting credit upon all concerned.—*Chicago Tribune.*

The "Water-Content" of Steam.

The water-content of steam, a subject about which there has been a deal of contradiction, is studied by Herr Corio in a German journal treating of steam boilers. With moderate velocity of steam in the steam-space, neither friction nor adhesion (he contends) will explain the carrying off of unevaporated water; but the phenomenon of formation of foam may. The author indicates the various circumstances that are favorable or unfavorable to this. He inquires into the results of variable removal of the steam. If the removal be suddenly stopped the pressure rises, and part of the steam formed is again condensed. With diminished pressure the reverse occurs. A small excess of heat renders vaporization imperfect, and there may be formation of cloud, as in the atmosphere. Such phenomena may, it is thought, account for the discrepancies in calorimetric determinations of the proportion of water in steam. Herr Corio recommends that the processes in a boiler be observed through a glass window. He will ere long describe a method of determining the water-contents, which seems to him very practicable.

Japanese as Railroad Men.

A writer in *Iron* who seems to be well informed on this subject says: "The Japanese, from whom, for some time past, all the stationmasters and porters, as well as platelayers and artisans, had been drawn, have latterly been gradually replacing the English engine-drivers, and apparently with satisfactory results. The chief fault to be found with the native drivers is seemingly that they do not thoroughly understand the construction of the engine under their charge, but this is a matter which longer experience will rectify. There also appears to be a lack of presence of mind and watchfulness, and it is somewhat ludicrous to read of a driver starting with only half of his train in broad daylight, and not discovering the want of the other half until he had reached the next station. It is, therefore, not surprising that strict examination and supervision has to be kept on all engines under native drivers, in order to avoid any chance of failures or casualties. At the same time, we are assured that very few mishaps had occurred—indeed, so far as misadventures with the locomotives are concerned, the Englishmen appear to have been quite as often at fault as their native fellows—while the increasing number of Japanese employed bears testimony to the confidence which is felt in their capabilities. In other capacities the native workmen display great skill, the carriage and wagon building, for instance, being carried on in a highly satisfactory manner by the Japanese foreman carpenter; and two engines, which had been transferred from one line to another, having been put together again and got ready for work by a native fitter without any assistance from Europeans. The only complaint made against them is that they are somewhat slow. It is clear, however, that the Japanese are quite well enough qualified to carry on the working of their railways; and, after the system has been completed, we should not be surprised to find that eventually they took the entire control into their own hands."

"Vignoles" and Double-headed Rails.

The general council of the Corps des Ponts et Chaussées reported some time ago to the French Ministry of Public Works that the question of the comparative advantages of the "Vignoles," or flat-bottomed, and double-headed types of rail, was one which was still unsettled, and which it was desirable to investigate fully, in order to decide definitely which type should be adopted for the future system of state railroads. The result of this recommendation was the appointment by the Minister of a committee to consider and report upon the question. The commission began its work by drawing up a series of questions, to which they have obtained replies from the officials of the great French railroads, from the controlling engineers appointed by the Corps des Ponts et Chassées, and from various foreign companies. The information thus gained has been digested into a report, lately published by the department.

The following are the conclusions of the report as given in a recent article published in *Iron*:

"We have thus the final result that, owing partly to the reduction in the weight of rails, partly to the absence of the chairs, and partly to a diminution in the quantity of ballast, a Vignoles road can be constructed at a less cost than a double-headed road, the difference amounting to several thousands of francs per kilometre. The report gives the working out of an example, in which a road laid with double-headed rails of 38 kilogrammes per metre (76 lbs. per yard) is compared first with a road laid with Vignoles rails of the same weight, and secondly with a branch line having rails of only 30 kilos. (60 lbs.), and 10 per cent. less sleepers. The saving in the first comparison is about 5,000 francs per kilometre, and, in the second, about 9,000 francs per kilometre ($1,536 and $2,736 per mile). It must be remembered that these figures are based, not on theory, but the actual practice of the great French companies."

Early Railroad History.

The Winchester (Va.) *News* gives the following interesting reminiscences of some early railroad history: "Forty years ago there were about 1,600 miles of railroad open in the United States. Seven years earlier still, when the Winchester & Potomac road was opened, the hundreds might have been counted easily on the fingers of one hand.

"So closely up with the progress of the day was our so-called unprogressive town. The Baltimore & Ohio was just opened to Harper's Ferry when our little road met it there. In fact it was not fully open to steam, the Chesapeake & Ohio Canal compelling it then, and for some years later, to break up its trains at Point of Rocks and run these 12 miles by horse power, for fear of frightening the skittish and fiery mules on the towpath and causing them to run away with the canal boats. There is no estimating the

reams of ink and paper consumed in the discussion of this imaginary danger. It was at one time proposed by the canal company that the railroad erect a board fence 10 to 12 ft. high the whole distance. All this time the idea of testing the matter practically hardly occurred to either side. Finally, the lawyers got hold of it; and then both corporations, more keenly alive to danger than the mules, were seized by the common instinct of self-defense, and saved their purses by an agreement.

"The Winchester & Potomac, like the Baltimore & Ohio, began operations before the question of most economical motive-power was fully settled. The choice lay between steam and horses; the B. & O. having first tried wind as far as Ellicott's Mills, with great success when there was a wind and it lay in the right direction. Our road had no steam when it was first finished through. The first car that traversed the line was drawn by horses—one horse if we recollect aright, for we are old enough to have seen it start. Its vehicle had four wheels, and was about the size of a modern caboose, only not so neat in appearance. It was unpainted, and looked like a small shanty. Windows at either end and on the sides, four in all, about the size of a bandana, gave the insiders a view of the country through which they whirled at a speed never before known to them. As far down as the Opequon, the live locomotive had an easy time of it, his chief concern on the down grade being to keep out of the way of the train. How he fared coming up we have forgotten. Probably he took on a helper.

"The passengers on that famous trip are now, we believe, all gone. They were the authorities of the road and one or two invited guests—the originators and creators, in the teeth of many difficulties, of the work.

"It was not long before an English engine arrived with two English carriages on the compartment plan still in use in Great Britain. Each car had six seats running crosswise, with ample room for five passengers each, or 30 in the car. Very pleasant, too, were those soft and capacious morocco-covered sofas, well padded both seat and back. The engine was carried across the highway bridge at Harper's Ferry piecemeal, the weight, only six tons, being deemed too heavy for the timbers. It was put together on this side, and one fine day astonished the natives by hauling its little train to Winchester. The strap rails stood it very well, as in fact it did for a quarter of a century longer, down to the war, with machines of three times the weight, and freight cars which could easily have carried the first locomotive."

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—The Boston *Advertiser* says: "During the past year this company has added materially to its mileage, both by acquirements and extensions. An important purchase was that of the Kansas City, Lawrence & Southern Kansas Railroad, with a mileage of 375 miles, connecting Kansas City, *via* Lawrence, Cherryvale and Coffeyville, with the Indian Territory, and by another stem, *via* Cherryvale, Independence and Harper, with the southwestern part of Kansas. Exclusive of the lines or branches in Mexico, the total mileage at present of the Atchison, Topeka & Santa Fe amounts to some 3,000 miles. The Colorado line, from Kansas City to Pueblo, is 635 miles in length. The New Mexico line leaves the main line at La Junta, Col., a distance of 571 miles from Kansas City, and extends in a southwesterly direction to Deming, New Mexico, a distance of 1,149 miles. A branch, 77 miles in length, extends from Rincon, a point on the New Mexico line, about 50 miles from Deming, to El Paso. From El Paso to the city of Mexico the connecting line will bear the name of Mexican Central Railroad. The distance between these two points is 940 miles, of which 200 miles are now graded, and about 75 miles of track laid.

"The additions made to the rolling stock of the Atchison, Topeka & Santa Fe within the past twelvemonth include 2,700 freight cars, 35 passenger cars and 46 locomotives. The amount of steel rails purchased during the year foots up the impressive total of 42,000 tons, sufficient to build and relay 500 miles."

Augusta & Knoxville.—Track is reported laid to Dorn's Mine, S. C., 45 miles north by west from Augusta, Ga., and 15 miles beyond the late terminus at Park's station. Work is progressing steadily.

Baltimore & Ohio.—At the regular meeting of the board in Baltimore, Jan. 11, President Garrett stated that, notwithstanding the continuance of the war of rates, the results to the Baltimore & Ohio on its main stem and branches showed a revenue for the month of December of $1,617,687.71, being an increase of $177,409.21 over the same month in 1880. Of this increase, $78,008.11 were from passenger traffic. The general activity of business upon all the lines of the company fully occupied its equipment. These results showed the absolute ability of the Baltimore & Ohio to maintain the differential rates which had been in operation for many years. President Garrett stated that these differences were so much less than the proportionate rates on a proper tariff that he found not only the city of Baltimore and the regions immediately served by the Baltimore & Ohio road, but the representatives of the centres of commerce in the Northwest, West and Southwest, thoroughly supporting the policy adopted by the company. The board adopted a resolution approving of the action of the Executive and directing the maintenance of the policy. It was unanimously determined that it would be unjust to all the great public interests connected with the lines of the Baltimore & Ohio Company, and against sound principles of business, to change the differences under the rates to New York below those heretofore fixed, and while the company would not object to the reference to arbitration of other subjects, the principle involved on this point would preclude such action.

The President stated that the business of the company in New York was very satisfactory, the company receiving more than the proportion of business agreed upon under the trunk-line pool, at rates above those charged by the New York Central & Hudson River Road, the preference being given to the Baltimore & Ohio Company on account of the rapid transportation and prompt delivery of freights shipped by its lines. President Garrett stated that the Baltimore & Ohio Company had fully maintained from Baltimore to Western centres the regular differences under its tariff rates made from New York, namely, on first and second classes, 8 cents, and on third and fourth classes 3 cents per 100 pounds, and that the west-bound business of the company from Baltimore also continued heavy.

Birmingham & Northwestern.—This company has been organized to build a railroad from Birmingham, Ala., northwest to Corinth, Miss., about 145 miles, through a section of country not now provided with railroads.

Bodie Lumber Co.—This company's road has been extended 1½ miles, making it 34 miles long. Grading is completed for an extension from the present terminus at Bodie, Cal., to the Standard Company's hoisting works, 1½ miles. The distance in an air line is only half a mile, but this length of track was required to overcome the elevation, which is 237 feet.

Boston & Albany.—The Springfield *Republican*, usually well informed on Boston & Albany matters, says that this company has not by any means given up its proposed line from Springfield to New York. The surveys have all been made; and the estimates of cost are now being prepared.

Boston & Maine.—On the morning of Jan. 2 a passenger train on this road broke through an iron bridge over a highway at Cole's Corner, near Wells, Me. The two engines and two cars passed over safely, but the postal car, smoking car and two passenger cars went down into the road. The wreck caught fire and was entirely destroyed. One man was killed, one fatally hurt and 75 others more or less injured, most of them slightly, nearly all being able to get out of the wreck before the fire had gone far. The bridge was of 56 ft. span, built by the New England Bridge Company in 1872, and had been inspected and pronounced safe a short time before. The investigation now in progress seems to indicate that an axle broke under the third car, throwing it down on the floor, and breaking down the bridge. The investigation is not yet finished.

Boston, Revere Beach & Lynn.—All the bridges on this road have now been widened in readiness for the second track, which is to be laid over the whole length of the roads, 8¼ miles. The work of putting the second track through the East Boston tunnel is to be begun at once.

Buffalo, Pittsburgh & Western.—At the annual meeting, Jan. 9, President Jones presented a report, which begins by explaining the impossibility of preparing an accurate financial statement in the first week of the new year, but says: "The gross receipts upon the same mileage as in 1880 were about $23,000 greater in 1881; that for the previous year the net earnings for the first three months of the year were less than for the same period in 1880, owing to the increased expenses consequent upon the unusually severe winter; but the net earnings for the last nine months were in excess of those for the last half of 1880, and were more than sufficient to meet the interest on the bonded debt for that time. The passenger traffic was larger than for the previous year, and would have been still greater were it not for the lack of equipment. The line to Buffalo and Salamanca will be finished early in the spring. In April the New Castle & Franklin Railroad was bought in for $850,000 and reorganized as the New Castle & Oil City Railroad, with a capital of $150,000 common and $450,000 preferred stock, and $600,000 first-mortgage bonds, all of which the company holds in its treasury. The expenditures for improvements thus far have been $50,000. The mines already opened on the branch near Jackson Centre are producing bituminous coal of a superior quality at the rate of 200,000 tons a year, with a capacity of three times as much. The Buffalo, Baltimore & Ohio is a new company formed in the interest of this road to build a line from New Castle to Chicago Junction, under joint traffic guarantees from this road and the Baltimore & Ohio. The New Castle & Oil City Railroad is to be extended to Oil City, and it is proposed to offer to the stockholders of this company the right to subscribe upon favorable terms for the securities necessary for its construction. The organized road will ultimately be merged into the parent company. Contracts have been signed with the New York, West Shore & Buffalo and the Buffalo, New York & Philadelphia roads for extensive terminal facilities at Buffalo, and for a line from Chicago Junction by way of Oil City to Buffalo.

Burlington, Cedar Rapids & Northern.—This company is now rebuilding the old Chicago, Clinton & Western line, from Clinton, Ia., westward, which it has owned for several years. Track is reported laid from Clinton to Noe's station, 23½ miles. Of this track 17 miles were laid several years ago, but have never been used regularly. The road is to run through to the main line at Elmira, whence a section of the same line to Iowa City and beyond is in operation.

Central, of New Jersey.—In the suit brought by this company to set aside the sale of some 50 acres of land adjoining this Morris Canal basin in Jersey City, and situated between the basin and the Central's station, to the Lehigh Valley Company, the New Jersey Court of Appeals has sustained the decision of the Chancellor dismissing the suit. This confirms the Lehigh Valley's title to the lands in question, and sets aside the Central's claim to their ownership. It is said that an appeal will be taken to the Supreme Court of the United States.

Chicago & Eastern Illinois.—It is again reported that a controlling interest in this road has been purchased by the Louisville & Nashville Company. It is said that the road will continue to be worked independently, but in the Louisville & Nashville interest.

Chicago, Freeport & Northwestern.—This company has been organized as the Illinois section of a projected line from Chicago to La Crosse, Wis., with numerous branches.

Chicago, Texas & Mexican.—A dispatch from Dallas, Tex., says that on Dec. 31 this company completed its track to a point 51 miles southward from Dallas and within two miles of Cleburne. This secures the company a bonus of $48,000 from the city of Dallas, voted on condition that 50 miles of the road should be finished in 1881.

Cincinnati, Georgetown & Portsmouth.—Track on this road is now laid to North Feesburg, O., seven miles eastward from the late terminus at Bethel, and 35 miles from the junction with the Little Miami road at Columbia. About six miles remain to reach Georgetown.

Cincinnati & St. Louis Air Line.—This company has filed articles of incorporation to build a narrow-gauge road from East St. Louis, Ill., due east to the Wabash River, with a branch from near Effingham northeast to a junction with the Toledo, Delphos & Burlington's St. Louis line.

Cincinnati, Virginia & Carolina.—This company has filed articles of incorporation in West Virginia to build a railroad on the following route: From Wadesboro', Anson County, N. C., running through Anson, Stanley, Cabarrus, Rowan, Davis, Iredell, Wilkes and Ashe counties in that state, through Grayson, Wythe and Tazewell counties, Virginia, entering West Virginia in McDowell or Mercer county, and thence through Wyoming, Logan, Lincoln, and Kanawha counties to the city of Charleston. The capital stock is $15,000,000. The incorporators are: Henry C. Hodgdon, Charles G. Wilson, C. A. Burgess, Charles S. Williams, T. T. Underdonk, and Thomas Allcock, of New York, and O. W. Wilmot, of Brooklyn, N. Y.

Cincinnati, Wabash & Michigan.—Grading on the extension of this road is now completed from Elkhart, Ind., northwest to Niles, Mich., 19 miles, and tracklaying was begun at Elkhart, Jan. 4.

Columbia & Puget Sound.—Surveys have been begun for an extension of this road (formerly the Seattle & Walla Walla) from Renton, Wash. Ter., to the coal field between Green and Cedar rivers. The extension will be about 30 miles long, and the intention is to begin work early in the spring.

Deadwood & Woodville.—This road was recently completed from Deadwood, Dak., in the Black Hills, to the Homestake Mine at Woodville. It is a narrow-gauge line, and the first railroad in the Black Hills. It is 9¼ miles long.

Delaware, Lackawanna & Western.—A movement is reported among some of the stockholders in favor of a stock dividend to represent the accumulated surplus of earnings invested in the property. It is claimed that this is equal to 25 per cent. of the present stock. So far as known, the movement is not favored by any of the directors or large holders.

Denver & Rio Grande.—This company makes the following statement for the year ending Dec. 31:

	1881.	1880.	Increase.	P.c.
Average mileage.....	786	474	312	66.0
Gross earnings.....	$6,206,813	$3,478,007	$2,728,806	78.5

The mileage in operation at the close of 1881 was 1,062 miles; at the close of 1880 it was 551 miles, an increase of 511 miles during the year.

Emory River & Careyville.—This company has been incorporated in Tennessee to build a railroad from Emory Gap on the Cincinnati Southern road to Careyville in Campbell County, by the Mountain Fork of Poplar and Stone and Weldon forks of Coal Creek. The incorporators are Charles A. Bulkley, Charles J. Bulkley, D. D. Williamson, Edwin F. Wiley and William J. Hornsby.

Erie & Corry.—It is proposed to build a railroad from Erie, Pa., by Lowville and Wattsburg to Corry. It is claimed that the proposed line is 32 miles long only, or five miles shorter than the Philadelphia & Erie between the two points.

Flint & Pere Marquette.—Track on the Manistee Division is now completed to Manistee, Mich., three miles beyond the late terminus at Stronach, and 25 miles northwest from the main line at Butler Junction. Trains were to begin running this week.

Georgia Pacific.—The Atlanta *Constitution* publishes the following official statement of the progress of this road:

"The distance from Atlanta to Anniston—crossing of Selma, Rome & Dalton road—is 101 miles. There has been graded 42 miles—say 33 miles west from Atlanta, 7 miles east from Anniston, and 2 miles finished at intermediate points. The other 59 miles is all under contract, the grading to be completed Aug. 1.

"Steel rail has been laid from the fair grounds near Atlanta to the Chattahoochee bridge, say six miles. Work on the bridge has been retarded by high water, and tracklaying into the city has awaited the closing of the exposition business. Tracklaying will soon proceed to and beyond Douglasville.

"The contractors, Wright & Co., Lee Bros. & Wright, C. R. Mason & Co., Perkins, Hutten & Perkins, Kelly & Browning, and Leake & Dunn Bros., are all at work on the line, and with the new year operations will be vigorously pushed.

"The distance from Anniston to Birmingham—junction with the Alabama Great Southern and the Louisville & Nashville railroads—is 65 miles. Preliminary lines having been heretofore run, the final location is being pressed to completion.

"The distance from Birmingham to Columbus, Miss., is about 120 miles. From Columbus, east, 20 miles have been graded and laid with steel rails. From the end of this grade and from Aberdeen east, and from Birmingham west, lines have been and are being run. Near Aberdeen, coming east, a small force is at work grading. West from Columbus to Geneva, and from Aberdeen toward Grenada and Arkansas City, surveys are about to be begun. From Geneva west to Johnsonville on the Sunflower, lines have been run.

"The company's narrow-gauge road from Greenville on the Mississippi to Johnsonville on the Sunflower, 32 miles, with a branch from Stoneville, down Deer Creek to the Sharkey County line, 24 miles (the last 12 miles just laid with iron), is being operated."

Grand Southern.—This road was recently opened for traffic by an excursion over the line, with the usual collation, speeches, etc. The road extends from St. John, N. B., westward to St. Stephen, 82½ miles; it is equipped with 5 engines, 2 smoking and baggage cars, 4 passenger and 50 freight cars. The road is laid with 50-lb. steel rails and is provided with repair shops, but most of the stations on the line are still to be built. Running parallel to the sea-shore it crosses many streams and has many bridges, most of them being wooden trusses; there is but one trestle bridge on the road.

Gulf & Pacific.—This latest project is for a railroad on the most direct possible line from New Orleans to Isleta, N. M., there to connect with the Atlantic & Pacific road. The distance is estimated at 1,130 miles; companies are to be organized in each state and territory through which the road will pass, and the whole contract let to a construction company to be organized in New York.

Hannibal & St. Joseph.—A dispatch from St. Louis, Jan. 6, says: "The Hannibal & St. Joseph Company yesterday filed a bill of complaint against Governor Crittenden, in the United States Circuit Court at Jefferson City, Mo., complaining that the state of Missouri had failed to pay the January interest on their bonds, under the pretence that the Hannibal road is in default, and that the state threatens to advertise said road for sale. The company asks to be adjudged and decreed to have paid a sum equal to all its indebtedness to the state; that the Governor convey to them all the first liens and mortgages held by the state June 20, 1881, and that the defendant be perpetually enjoined and restrained from selling the road."

It is announced that all the general offices will be moved to Hannibal, Mo., on Feb. 1 next.

Houston & Texas Central.—This company's Texas Central line, which is an extension of its Waco & Northwestern Division, is now completed and opened for business to Albany, in Shackelford County, Tex., 34 miles northwest from the late terminus at Cisco, 177 miles from Ross, where the Texas Central begins, and 231 miles from the main line at Bremond. The new terminus is 374 miles from Houston. The company now works 799 miles of road.

Indiana, Illinois & Iowa.—Track is reported laid from Momence, Ill., through Kankakee to the Chicago & Alton crossing at Dwight, a distance of 43 miles. This is an addition of 17½ miles to the iron previously reported, the gaps closed having been from Kankakee westward and from Dwight eastward.

Joliet, Lockport & Aurora.—This company has filed articles of incorporation to build a railroad from Joliet, Ill., northwest to Aurora, about 30 miles. The offices are to be in Lockport, Ill.

Leavenworth, Topeka & Western.—Tracklaying on this road was begun in Leavenworth, Kan., Dec. 31.

Lehigh Valley.—This company has completed a branch from its Hazleton Division at Park Island Junction, near Jeddo, Pa., to Freeland, a distance of two miles. The new branch reaches several collieries.

Louisville & Nashville.—This company makes the following approximate statement for the six months ending Dec. 31:

Gross earnings		$5,637,844
Expenses (60.1 per cent)		3,429,816
Net earnings		$2,208,028
Income from investments		319,014
Balance, June 30		485,221
Total		$3,012,263
Fixed charges	$1,886,285	
Dividend of 3 per cent	543,900	
		2,430,185
Undivided surplus, Dec. 31		$582,078

The statement covers 1,837 miles worked, and does not include the Louisville, Cincinnati & Lexington, worked for two months of the half-year.

Manchester & Keene.—This road will be operated by the Boston & Lowell Company from Jan. 16. It extends from Greenfield, N. H., to Keene, 30 miles, and has been worked by the Connecticut River Company under temporary arrangement.

Manhattan Elevated.—The new agreement and lease of the New York Elevated road has been formally approved by the stockholders of both companies.

The new Attorney-General of New York has notified this company to appear before him and show cause why a new suit should not be begun to annul the charter and dissolve the company.

Minneapolis & St. Louis.—The branch from Wyoming, Minn., to Taylor's Falls, heretofore used jointly by this company and the St. Paul & Duluth, is now worked by this company exclusively, the St. Paul & Duluth trains having been withdrawn.

Minnesota State Railroad Bonds.—The settlement of these long-disputed bonds has at last been made in pursuance of the act lately passed by the Minnesota Legislature. The claims were settled by payment of a certain proportion in cash, and the funding of the rest in new bonds bearing 4½ per cent. interest. Small claims against the old roads built by the issue of state bonds were also paid in cash, their amount being about $157,000. The largest holder of the old bonds was Mr. Selah Chamberlain, of Cleveland, who received $2 000,000 in new bonds and $200,000 in money.

Mississippi, Albuquerque & Interoceanic.—This company has been organized in New Mexico to build a railroad from Albuquerque in that territory eastward to the Mississippi River opposite Greenville, Miss. The object is to connect the Atlantic & Pacific and the Georgia Pacific roads.

Mississippi Valley & Ship Island.—An agreement has been made for the consolidation of this company, the New Orleans & Mississippi Valley, the Memphis & Vicksburg and the Tennessee Southern companies. The consolidated company will have completed about 30 miles of narrow-gauge road; its projected line is from New Orleans to Cairo parallel to and not far from the Mississippi River, on the eastern side.

Missouri, Kansas & Texas.—Two spurs or short branches have lately been completed from this road in the Indian territory. One is from Atoka west five miles, the other from Savanna, one mile; both have been built to reach coal mines.

Missouri Pacific.—Track is now laid on the Jefferson City, Lebanon & Southwestern Branch to a point 7 miles beyond the late terminus at Russellville, Wis., and 26 miles southwest from Jefferson City. Work is progressing steadily toward Carthage.

Morristown & Carolina.—This company has been organized to build a road from Morristown, Tenn., nearly due south to the North Carolina line. It is the Tennessee end of the projected Atlantic & French Broad road.

New York, Chicago & St. Louis.—On Jan. 1 track had been laid on this road as follows: From Valparaiso, Ind., west 19.28 miles, and east 52.29 miles; from Hadley, Ind., west 12 miles; from Ft. Wayne, Ind., to Bellevue, O., 123.81 miles; from Cleveland east 62 miles, making a total of 269.38 miles, an increase of 69.38 miles since the last report received.

Work has been very much retarded by the bad weather during December, but is being pushed as rapidly as possible under the circumstances. There are 110 miles thoroughly ballasted. There are 1,051 flat and 12 caboose cars in active construction service; by the last of January there will be 39 locomotives on the road. Work has progressed rapidly on the large round-house in Bellevue, O., and it will be soon completed.

The construction of the telegraph line is well under way; the poles are 30 ft. long, 6 in. at top, and four No. 6 galvanized wires are being strung.

New York, New Haven & Hartford.—At the annual meeting in New Haven, Jan. 11, a resolution providing for a committee to investigate the company's affairs was voted down. A petition against Sunday trains was postponed.

New York, Ontario & Western.—A small force has lately been at work repairing the De Ruyter Branch, on which no trains have been running for a long time.

New York, Susquehanna & Western.—It is stated that the contract between this company and the Delaware, Lackawanna & Western has been finally concluded and signed. This company agrees to stop its extension at Stroudsburg, making the connection there with the Lackawanna road. The Delaware, Lackawanna & Western on the other hand agrees to carry all business offered to and from Scranton, charging for the service 37 per cent. of the gross receipts between New York and Scranton as its *pro rata* share.

Norfolk & Western.—At the annual meeting in Norfolk, Va., Jan. 11, the stockholders approved the agreement with the East Tennessee, Virginia & Georgia and the Shenandoah Valley companies; also the action of the board in aiding the New River road. Resolutions were adopted recommending the directors to adopt measures to increase the terminal facilities at Norfolk; to assist in the establishment of steamship lines between that port and others in this country and Europe; to develop the coal, iron and mineral resources of Virginia, and to enable them to obtain the increase of rolling stock required by the growing business of the company. Resolutions were also adopted authorizing the board to effect a consolidation to construct branch roads and extend, by lease or otherwise, the main line of the road.

Northeastern, of Georgia.—On Jan. 3 trains began running on the extension of this road from Rabun Gap Junction, Ga., on the Atlanta & Charlotte Air Line, northward to Clarkesville, 10 miles. Grading is in progress to Tallulah, 11 miles further. Rabun Gap Junction, the starting point of the extension, is 13 miles north of Lula, where the older part of the road connects with the Air Line.

Northern Pacific.—Work was begun Jan. 6 on the long tunnel through the Mullan Pass, about 15 miles from Helena, Montana. This tunnel will be 3,800 ft. long, chiefly through rock, and its estimated cost is $350,000.

Two or three bills have been introduced in Congress to declare the land grant of this company forfeited on account of its failure to complete the road within the time specified in the original grant. Resolutions of inquiry have also been offered as to the amount of land heretofore deeded to the company.

Surveys are being made for a branch line down the Red River to Pembina, parallel to the St. Paul, Minneapolis & Manitoba road.

Nova Scotia.—The government of Nova Scotia has made an agreement with E. W. Plunkett, who agrees to organize a company with a capital of $10,000,000, to which all the railroads which the provincial government owns, or has the right to acquire, are to be transferred. These include the Eastern Extension and Pictou Branch, 130 miles; Windsor & Annapolis, 116; Western Counties, 67 miles. The company is to add 23 miles to the Western Counties road and 80 miles to the Eastern Extension, and is to build the Nictaux & Atlantic, 72 miles, the Pictou Extension, 26 miles, the Dartmouth Branch, 12 miles, and a line in Cape Breton. The company is to pay the government $1,350,000 for the completed lines, and is to receive subsidies in cash and land for the new lines, and a guarantee on its bonds to the amount of $225,000 yearly.

Ohio & Mississippi.—The Receiver's statement for the month of December is as follows:

Cash Dec. 1		$220,048.31
Receipts from all sources		554,518.79
Total		$783,567.10
Vouchers, etc, prior to receivership	$6,511.84	
Vouchers, pay-rolls, etc	472,954.19	
		479,466.03
Cash balance, Jan. 1, 1882		$304,101.07

The receipts were $75,052.76 in excess of the disbursements for the month.

The board of directors has decided to call a meeting of stockholders to act upon the plan of reconstruction proposed, which provides for the issue of new bonds at a low rate of interest to pay off all floating debt, Receiver's debts, etc., and to replace the present bonds as they mature.

Painesville & Youngstown.—It is stated that this company made default on the January coupons on its first-mortgage bonds. The present company succeeded through foreclosure to an earlier company of the same name. Its debt consists of $400,000 first-mortgage and $1,000,000 income bonds. The road is of 3-ft. gauge and 65 miles long, from Youngstown, O., to Fairport, on Lake Erie. It was recently reported sold to the Pittsburgh & Western Company.

Pennsylvania.—It is said that this company is completing surveys for a line from its new Long Branch extension southward along the shore to Atlantic City and thence to Cape May. This would complete a line along the whole extent of the New Jersey shore from Sandy Hook to Cape May, and would open up many excellent beaches and make them summer resorts. It would also make a short line from New York to Atlantic City and Cape May.

Pennsylvania & New England.—A controlling interest in this unfinished road (formerly the South Mountain & Boston) has been sold to J. C. Stanton, of Boston, and M. Campbell, of Detroit, who promise to begin work at once and to complete the road this year.

Pensacola & Atlantic.—Vice-President and General Superintendent W. D. Chipley issued the following circular Jan. 1, when the first construction train was placed on this road:

"This circular will be read by very few when first issued; but they enjoy the proud distinction of being the first to open the throttle, pull the bell-cord, fire up, answer the call for brakes or to watch through rain and storm the track of the Pensacola & Atlantic Railroad.

"Each month will see our rails stretching out from four different points, rapidly accomplishing our great mission of uniting with bands of steel the two great sections of our state, at the same time completing the last link in the shortest rail connection between the Atlantic and the Pacific oceans. Your comrades will increase almost daily, and as each recruit joins your ranks, this circular will teach him the cardinal rule of the service. He will learn that it will be the policy of the company to reward merit, and that promotions will be confined to our own ranks as long as they furnish the material to supply vacancies.

"The length of service will be specially considered, but the class of men whose only aim is to do just so much as will retain their names on the pay-roll, and no more, will be specially marked for early dismissal.

"Service will mean actual, earnest efforts in the company's interest; such interest as not only tends to duties specially laid down and enumerated, but real workers, who will cheerfully stay on duty just a little longer, whenever by so doing trains can be hastened, track can be made safer, manifests can be hurried forward, or business facilitated, and last, but not least, when by pleasant words our patrons can be informed and assisted; for from the highest to the lowest employé it must be understood that it is no favor to wait on the public, but a duty, for which we are all paid, and when this duty cannot be performed pleasantly their usefulness will have ended, and their services will be dispensed with, certainly and irrevocably. Actuated by these aims, an *esprit de corps* will soon be created which will lighten the burden of our labors and render efficient our organization."

Philadelphia & Reading.—The annual meeting began in Philadelphia, Jan. 9, Mr. George M. Dallas, the Master appointed by the Court, presiding. The meeting opened by several sharp discussions over the reading of the annual report, but Mr. Dallas decided that it must be read, and the reading of the long document occupied a large part of the day. When the voting finally began, objections were offered to many votes, and it became apparent that a long time would be occupied by the voting, so that an adjournment to the next day was had. The two tickets in the field were as follows; the Gowen ticket had the following names: President, Franklin B. Gowen; Managers, J. B. Lippincott, Henry Lewis, I. V. Williamson, Eckley B. Coxe, Edward C. Knight, Joseph B. Altemus; Treasurer, Samuel Bradford; Secretary, Albert Foster. The opposition ticket read as follows: For President, Frank S. Bond; for Managers, George F. Tyler, Samuel R. Shipley, John S. Newbold, Edward T. Steel, Charles Parrish, John Lowber Welsh; for Treasurer, Samuel Bradford; for Secretary, Edgar L. Kinsley.

Under the company's charter the stockholders elect the President, Secretary and Treasurer as well as the managers. On Jan. 10 the voting continued slowly, without special incidents.

The voting continued on Jan. 11, and on Jan. 12 the prospect was that it would last through the week. So far, the Gowen ticket was ahead, but the McCalmont proxies had not yet been voted.

Philadelphia, Wilmington & Baltimore.—At the annual meeting, Jan. 9, the stockholders approved the purchase of the Delaware & Chesapeake road, which is a branch of the Delaware Division, extending from Clayton, Del., to Oxford, Md., 54 miles.

Poughkeepsie Bridge.—It is reported that an agreement has been made for the lease of this bridge to the Poughkeepsie, Hartford & Boston Railroad Company, the lessee to build the bridge and control it when completed. In what way the money to build the bridge is to be raised is not stated.

Providence, Ponagansett & Springfield.—An effort is being made to revive this project for a railroad from Providence, R. I., by Pomfret, Conn., Willington and Stafford to Springfield, Mass. A meeting of the corporators was recently held at Willimantic and arrangements made to secure stock subscriptions.

St. Johns & Halifax.—This company has been incorporated to build a railroad from the St. Johns River at Rollestown in Putnam County, Fla., to a point on the Halifax River in Volusia County. The distance is about 45 miles.

St. Johns & Suwannee.—This company has filed articles of incorporation for a railroad from Melrose in Alachua County, Fla., through Gainesville to the Suwannee River near Ft. Fanning, a distance of 60 miles.

St. Louis & San Francisco.—A cross-cut line has been completed from Sedgwick, Kan., on the Wichita Branch of the Atchison, Topeka & Santa Fe, northwest to Halstead on the main line of the same road. It is intended to shorten the distance for western business to and from the St. Louis & San Francisco at Wichita, and has been built by that company, although it connects two points on the Atchison Topeka & Santa Fe. It is about nine miles long.

St. Paul, Minneapolis & Manitoba.—On the Northwestern Branch, which runs from Minneapolis, Minn., west by north, generally parallel to the main line, but some distance to the southwest and on the opposite side of the Mississippi, the track reached Clearwater, 50 miles from Minneapolis, on Jan. 6. About four miles had been laid since Jan. 1. Trains will probably begin running next week.

San Diego, Port Isabel & Sonora.—A concession has been granted by the Mexican government to Thomas L. Rodgers, Vice-President of the California Southern company, for a railroad from San Diego, Cal., to Port Isabel in Mexico, and thence to a connection with the Sonora Railroad; also for branches to San Rafael in Lower California, and to Altar in Sonora.

Securities on the New York Stock Exchange.—The following securities have been placed on the lists at the New York Stock Exchange:

Elizabeth City & Norfolk, $1,000,000 stock; $250,000 debenture certificates; $900,000 first-mortgage bonds and $1,000,000 income bonds.

Indianapolis, Decatur & Springfield, $1,800,000 first-mortgage bonds and $1,000,000 second-mortgage bonds.

Minneapolis & St. Louis, $636,000 Southwestern Extension bonds and $930,000 Pacific Extension bonds.

New Orleans Pacific, $1,820,000 additional first-mortgage bonds, Nos. 4,001 to 5,820.

St. Paul, Minneapolis & Manitoba, $1,380,000 additional Dakota Extension bonds, Nos. 2,401 to 3,780.

The Governing Committee has again refused to list stocks of the New York elevated companies under the new agreement.

South Carolina.—Notice is given that the first-mortgage domestic 7 per cent. bonds now due will be paid at the company's office, No. 76 Wall street, New York; interest upon them will cease from Feb. 1 next. Holders will have the option until Feb. 1 of exchanging them for the consolidated 6 per cent. bonds of the new company, interest to be adjusted to date of exchange.

South Florida.—This road has been extended from the late terminus at Orlando, Fla., soutward 18 miles to Kissimee in Polk County. It is now 40 miles long, from Sandford on the St. Johns River to Kissimee.

Sussex Midland.—An old charter and project of this name have been revived, and at a recent meeting of parties interested it was resolved to complete the organization and take steps to build the road. The projected line is from the Junction & Breakwater road, at Georgetown, Del., to Kent Island, Md., on Chesapeake Bay, whence a connection with Baltimore would be made by steamboat.

Toledo, Peoria & Western.—In a suit brought by Jonathan Hancock, a judgment creditor of the old Toledo Peoria & Warsaw company to have the stock of the new company placed in the hands of a receiver and sold for the benefit of creditors, on the ground that the reorganization was intended to defraud them, the United States Circuit Court in Chicago has sustained a demurrer and dismissed the bill, holding that the reorganization was in good faith, and that provision was made for the settlement of floating debt claims by the issue of securities of the new company.

Wabash, St. Louis & Pacific.—The Champaign & Southeastern Branch is completed and trains began to run over it last week. It is 12 miles long, extending the Champaign, Havana & Western Branch (which has hitherto made connection with the main line over the Indiana, Bloomington & Western road) from Champaign, Ill., southeast to Sidney on the main line.

Wheeling & Lake Erie.—It is reported that an agreement of consolidation has been made between this company, the Cleveland & Marietta and the Valley Railroad Company. The terms include the completion of this road as planned, and the building of the proposed extension of the Valley road to Canal Dover, where it will connect with the Cleveland & Marietta. The consolidated company will have about 300 miles of road, when the lines are finished, with termini on the Ohio at Wheeling and Marietta, and on Lake Erie at Cleveland, Huron and Toledo.

Wilmington & Weldon.—The 2,000 shares of new stock, the issue of which was authorized at the recent annual meeting for the purpose of building branch roads, etc., were recently awarded to J. Harmanus Fisher & Son, of Baltimore, the highest bidders, at $101.50 per share.

Wilmington, Wrightsville & Jacksonville.—This company was recently organized to build a railroad from Wilmington, N. C., northeast to Jacksonville, in Onslow County, about 50 miles. Subscriptions are asked for along the proposed line.